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KEY TO DAVIES' UNIVERSITY ARITHMETIC.

Revised Ed.

Educ T 118.56.321

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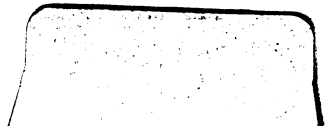
OF NEW YORK

JANUARY 25, 1924



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KEY

TO

DAVIES'

UNIVERSITY ARITHMETIC,

EMBRACING

THE ANSWERS, AND A FULL ANALYSIS AND SOLUTION OF THE DIFFICULT QUESTIONS.

VALUABLE ONLY TO THOSE WHO LABOR.

NEW-YORK:
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1856.

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PREFACE.

It is not yet a settled question whether a Key to a Mathematical work is an aid or a hindrance. The diversity of opinion which exists on this point doubtless arises from the different *uses* to which a Key is applied. A Key should never be used to supersede investigation and labor; but always to turn the former into right channels, and to make the latter more available and effective.

How to study—how to investigate—how to labor, and how to teach, are the great questions; and it is these which a Key should answer.

It is not results alone that give value to a Key; but it is the explanation of methods—the examination of principles applied in the solution of problems, and a general and minute analysis of such questions as contain within themselves the germs of science.

It is also the province of a Key to lessen the *mechanical labor* of Teaching. Amid the various and complicated duties of the school-room, the teacher can

scarcely find time to work out every question on the slate or blackboard. In the Key he not only finds the best forms of analysis, but also the best arrrangement of the work to be done; hence, he has a standard to which the work of his pupils should conform. He has only to guard against the danger of permitting his Key to become *a substitute* for a full and thorough investigation on his part, and he will avail himself of the general analysis and the best practical methods, without at all interfering with the independent operations of his own mind.

Great care has been taken to make a full and complete analysis of every question whose solution presents a new principle; and so to construct the analysis as to make that principle most apparent. It is believed that all the important forms of analysis have been given, and that all the classes of practical questions have been considered.

FISHKILL LANDING,
July, 1856.

KEY.

ROMAN NOTATION.

	(1)	(2)	(3)	(4)
Ans.	XVI.	XIV.	XVIII.	LXIX.
	(5)	(6)	(7)	(8)
Ans.	LXXVIII.	CXV.	CCCCIX.	DCCLI.
	(9)	(10)	(11)	(12)
Ans.	MLX.	MMXCI.	DLXIX.	DCCXLV.
	(13)	(14)	(15)	
Ans.	DCCCCLXI.	DCXCIX.	DCCCCLVII.	
	(16)	(17)	(18)	
Ans.	MCCVI.	CCCCXCV.	DCCLV.	
	(19)		(20)	
Ans.	MDCCCXLVII.	*Ans.*	MMDXX.	

ARABIC NOTATION.

	(1)	(2)	(3)	(4)
Ans.	7	*Ans.* 80	*Ans.* 9000	*Ans.* 93
	(5)	(6)	(7)	(8)
Ans.	961	*Ans.* 7408	*Ans.* 897,021	*Ans.* 86,029,430
	(9)	(10)	(11)	
Ans.	4,328,021,063	*Ans.* 967,040,932	Ans. 30,430,208,123	

(12)
A. 360,030,702,010

(13)
5,800,006,000,812

(14)
75,605,070,905,008

(15)
Ans. 904,000,800,200,720

(16)
Ans. 6,000,900,704,098,020

(17)
Ans. 80,510,006,040,900,040,900

(18)
Ans. 6,050,900,001

(19)
Ans. 987,654,321,012,345,678

(20)
Ans. 208,104,111,001,111,111

NUMERATION.

(1)

Ninety-seven. *Ans.*

(2)

Three hundred and twenty-six. *Ans.*

(3)

Three thousand three hundred and two. *Ans.*

(4)

Sixty-five thousand and forty-two. *Ans.*

(5)

Seven hundred and forty-two thousand, six hundred and four.

(6)

Thirty-two millions, forty-five thousand, six hundred and seven.

(7)

Ninety millions, four hundred sixty-four thousand, two hundred and thirteen. *Ans.*.

(8)

Forty-seven millions, three hundred sixty-four thousand, two hundred and ninety-one. *Ans.*

(9)

Four billions, thirty-seven millions, nine hundred and two thousand, one hundred and sixty-nine. *Ans.*

(10)

Ninety-one millions, forty-six thousand, three hundred and two.

(11)

Seven hundred eighty-four millions, two hundred thirty-six thousand, seven hundred and four. *Ans.*

(12)

Seven billions, four hundred and three millions, twenty-six thousand, and fifty-four. *Ans.*

(13)

Twenty-one billions, seven hundred and four millions, eighty thousand, four hundred and ninety-five. *Ans.*

(14)

Twenty-one billions, eight hundred ninety-six millions, seven hundred and twenty thousand, four hundred and twenty-one.

(15)

Eight trillions, one hundred and forty billions, two hundred and ninety millions, three hundred and eight thousand and ninety-seven. *Ans.*

(16)

Eight trillions, five hundred and four billions, six hundred and eighty millions, four hundred and sixty-seven thousand, and twenty-three. *Ans.*

(17)

Ninety trillions, four hundred and three billions, forty millions, seven hundred and twenty thousand, one hundred and fifty-six. *Ans.*

(18)

One hundred and seventy-two trillions, three hundred and four billions, seven hundred and thirty-six millions, eight hundred and ninety-three thousand, two hundred and ten. *Ans.*

(19)

Thirty trillions, four hundred and sixty-seven billions, two hundred and fourteen millions, three hundred and two thousand, seven hundred and four. *Ans.*

(20)

One hundred and sixty-seven trillions, three hundred and twenty billions, four hundred and ten millions, three hundred and forty-one thousand, two hundred and four. *Ans.*

(21)

Two quadrillions, one hundred and sixty-four trillions, thirty-two billions, one hundred and eighty-nine millions, seven hundred and sixty-five thousand, four hundred and twenty-one.

(1)
Ans. 621

(2)
Ans. 5,702

(3)
Ans. 8,001

(4)
Ans. 10,406

(5)
Ans. 65,029

(6)
Ans. 40,000,241

(7)
Ans. 59,000,310

(8)
Ans. 12,111

(9)
Ans. 300,001,006

(10)
Ans. 69,003,000,211

(11)
Ans. 47,000,069,000,465,207

(12)
Ans. 800,000,000,000,429,006,009

(13)

Ans. 95,000,000,000,000,089,089,306

(14)

Ans. 6,000,000,451,065,047,104

(15)

Ans. 999,065,841,411

(16)

Ans. 470,040,000,000,000,000,000,000,004,006,204

(17)

Ans. 65,000,800,000,750,751,975,310

(1) *Ans.* 2 ; 7

(2) *Ans.* 7 ; 3

(3) *Ans.* 1 ; 7

REDUCTION.

(6)

Ans. 42600 cents, 426000 mills.

(7)

Ans. 36860 cents.

(8)

Ans. 8 dollars 75 cents.

(9)

Ans. 433005 mills.

(10)

Ans. £37 × 20 + 9*s.* = 749*s.* ; 749*s.* × 12 + 8*d.* = 8996*d.*

(11)

1569*far.* ÷ 4 = 392*d.* + 1*far.* ; 392*d* ÷ 12 = 32*s.* + 8*d.* ;
32*s.* ÷ 20 = £1 + 12*s.* ; £1 12*s.* 8*d.* 1*far.* *Ans.*

(12)

7 *T.* × 20 + 14*cwt.* = 154*cwt.* ; 154*cwt.* × 4 + 1*qr.* = 617*qr.* ;
617*qr.* × 25 + 20*lbs.* = 15445*lbs.* *Ans.*

(13)

15445*lbs.*÷25=617*qr.*+20*lbs.*; 617*qr.*÷4=154*cwt.*+1*qr.*; 154*cwt.*÷20=7 *T.*+14*cwt.*; 7 *T.* 14*cwt.* 1*qr.* 20*lbs.* *Ans.*

(14)

4*lb.*×12+6*oz.*=54*oz.*; 54*oz.*×20+12*dwt.*=592*dwt.*; 592*dwt.*×24+7*grs.*=26215 grains. *Ans.*

(15)

704121*gr.*÷24=29338*dwt.*+9*gr.*; 29338*dwt.*÷20 =1466*oz.*+18*dwt.*; 1466*oz.*÷12=122*lb.*+2*oz.*
Ans. 122*lb.* 2*oz.* 18*pwt.* 9*gr.*

(16)

5 ℔ ×12+1 ℥ =61 ℥; 61 ℥ ×8+1 ʒ =489 ʒ ; 489 ʒ ×3+ 1 ℈ =1468 ℈; 1468 ℈ ×20+2*gr.*=29362*gr.* *Ans.*

(17)

174947*gr.*÷20=8747 ℈ +7*gr.*; 8747 ℈÷3=2915 ʒ +2 ℈ ; 2915 ʒ ÷8=364 ℥ +3 ʒ ; 364 ℥ ÷12=30 ℔ +4 ℥.
Ans. 30 ℔ 4 ℥ 3 ʒ 2 ℈ 7*gr.*

(18)

6*yd.*×3+2*ft.*=20*ft.*; 20*ft.*×12+9*in.*=249*in.* *Ans.*

(19)

5*mi*×320=1600 *rods.*; 1600*rd.*×5½=8800 *yards*; 8800*yd.*×3 =26400*ft.*; 26400*ft.*×12=316800 *inches.* *Ans.*

(20)

2730*in.*÷12=227*ft.*+6*in.*; 227*ft.*÷3=75*yd.*+2*ft.*
Ans. 75*yd.* 2*ft.* 6*in.*

(21)

56 *sq.ft.*÷9=6 *sq. yd.* 2 *sq.ft.* *Ans.*

(22)

$355P.\div 40=8R.+35P.$; $8R.\div 4=2A.$

Ans. $2A.\ 0R.\ 35P.$

(23)

$456\ sq.\ ch.\div 10=45A.\ 6\ sq.\ ch.$ *Ans.*

(24)

$3A.\times 4+2R.=14R.$; $14R.\times 40+8P.=568P.$ *Ans.*

(25)

$14T.\times 40=560\ cu.\ ft.$; $560\ cu.\ ft.\times 1728=967680\ cu.\ in.$ *A.*

(26)

$31C.\times 128=3968\ cu.\ ft.$ *Ans.*

(27)

$56320\ cu.\ ft.\div 128=440\ cords.$ *Ans.*

(28)

$157yd.\times 4=628qr.$; $628qr.\times 4=2512na.$ *Ans.*

(29)

$192\ E.\ F.\times 3=576qr.$; $576qr.\div 4=144yds.$ *Ans.*

(30)

$97yd.\times 4+3qr.=391qr.$; $391qr.\div 5=78\ E.\ E.\ 1qr.$ *Ans.*

(31)

$4hhd.\times 63=252gal.$; $252gal.\times 4=1008qt.$ *Ans.*

(32)

$7560pt.\div 2=3780qt.$; $3780qt.\div 4=945gal.$;

$945gal.\div 63=15hhd.$ Ans.

(33)

$7hhd. \times 54 = 378gal.$; $378gal. \times 4 = 1512qt.$;
$1512qt. \times 2 = 3024pt.$ *Ans.*

(34)

$74304 \div 2 = 37152pt.$; $37152pt. \div 2 = 18576qt.$; $18576qt. \div 4 = 4644gal.$; $4644gal. \div 36 = 129$ *barrels.* *Ans.*

(35)

$31bu. \times 4 = 124pk.$; $124pk. \times 8 = 992qt.$; $992qt. \times 2 = 1984pt.$

(36)

$2110pt. \div 2 = 1055qt.$; $1055qt. \div 8 = 131pk. + 7qt.$; $131pk. \div 4 = 32bu. + 3pk.$
Ans. 32*bu.* 3*pk.* 7*qt.*

(37)

$365da. \times 24 + 5hr. = 8765hr.$; $8765hr. \times 60 + 48m. = 525948m.$;
$525948m. \times 60 + 48sec. = 31556928sec.$; $31556928sec. \times 2 = 63113856sec.$ *Ans.*

(38)

$254da. \div 30 = 8mo.\ 2wk.$

ADDITION.

(1)	(2)	(3)
Ans. 182630	*Ans.* 87539	*Ans.* 110526
(4)	(5)	(6)
Ans. 79165	*Ans.* 73285	*Ans.* 4148907
(7)	(8)	(9)
Ans. 395873	*Ans.* 30534*da.*	*Ans.* 74716*bu.*
(10)	(11)	(12)
Ans. 29909*rds.*	*Ans.* 74022*min.*	*Ans.* 833516*galls.*

(13) *Ans.* 32921 miles.

(14) *Ans.* 185876*fur.*

(15) *Ans.* 93684*lbs.*

(16) *Ans.* 34289 dollars.

(17) *Ans.* 243972 casks.

(18) *Ans.* $991,546

(19) *Ans.* $85,465

(20) *Ans.* $770,56

(21) *Ans.* $525,892

(22) *Ans.* $9638,495

(23) *A.* £223 2*s.* 5*d.* 1*far.*

(24) *Ans* 1296*lb.* 10*oz.* 2*pwt.*

(25) *Ans* 453 ℔ 9 ℥ 3 ʒ

(26) *Ans.* 2*cwt.* 3*qr.* 8*lb.* 8*oz.* 5*dr.*

(27) *Ans.* 43 *T.* 2*cwt.* 0*qr.* 7*lb.*

(28) *Ans.* 312*yd.* 0*qr.* 2*na.*

(29) *Ans.* 251 *E. E.* 1*qr.* 3*na.*

(30) *Ans.* 143*L.* 2*mi.* 6*fur.*

(31) *Ans.* 4*fur.* 4*rd.* 0*yd.* 1*ft.* 7*in.*

(32) *Ans.* 322*A.* 1*R.* 4*P.*

(33) *Ans.* 2224*T.* 0*hhd.* 5*gal.*

(34) *Ans.* 339*gal.* 3*qt.* 0*pt.*

(35) *Ans.* 230*chal.* 25*bu* 3*pk.* 4*qt.*

(36) *Ans.* 823*yr.* 10*mo.*

(37) *Ans.* 904*da.* 18*hr.* 1*m.*

(38) *Ans.* 2*T.* 14*cwt.* 1*qr.* 20*lb.* 15*oz.*

(39) *Ans.* 23592550

(40) *Ans.* 137915940

(41) *Ans.* 88056

(42) *Ans.* 121*mi.* 4*fur.* 8*rd.* 5*ft.*

(43) *Ans.* 519190

(44) *Ans.* 1124749

(45) *Ans.* $22,009

(46) *Ans.* $27,74

(47) *Ans.* 2*T.* 2*hhd.* 29*gal.* 2*qt.*

(48) *Ans.* $20308675

(49) *Ans.* $30569853

(50) *Ans.* $.29026

(51) *Ans.* $8209,75

(52) *Ans.* 26326424

(53) *Ans.* 29714

(54) *Ans.* 50110025

(55) *Ans.* 59808512

(56) *Ans.* 2*T.* 4*cwt.* 2*qr.* 1*lb.*

(57) *Ans.* 205 *acres.*

(58) *Ans.* $75002,295

(59) *Ans.* $7425

(60) *Ans.* 4*lb.* 5*oz.* 6*pwt.*

(61) *Ans.* 1053420

(62) *Ans.* 4089507

(63) *Ans.* 32341

(64) *Ans.* $27131,23

(65) *Ans.* $28.105

(66) *Ans.* 39*yd.* 1*qr.*

(67) *Ans.* $180,825

(68) *Ans.* $35068,807

(69) *Ans.* 481125

(70) *Ans.* 66585383

(71) *Ans.* $1019,10

(72) *Ans.* $33800

(73)
Ans. 380*bu.* 1*pk.*

(74)
Ans. $458,342

(75)
Ans. £57 14*s.* 2*d.* 3*far.*

(76)
Ans. 5860

SUBTRACTION.

(1)
Ans. 363296

(2)
Ans. 56579

(3)
Ans. 733071

(4)
Ans. 1711927

(5)
Ans. 41923288

(6)
Ans. 7838180

(7)
Ans. 106026

(8)
Ans. 4391

(9)
Ans. 62786

(10)
Ans. 198621115

(11)
Ans. 3591757651

(12)
Ans. 4199675

(13)
Ans. 8878778

(14)
Ans. 99999977

(15)
Ans. $8443,641

(16)
Ans. 806,384

(17)
Ans. $4853673,758

(18)
Ans. £14 18*s.* 3*d.* 1*far.*

(19)
Ans. 3*ton* 8*cwt.* 2*qr.* 7*lb.*

(20)
Ans. 117*yd.* 2*qr.* 1*na.*

(21)
Ans. 59*L.* 1*mi.* 3*fur.* 28*rd.*

(22)
Ans. 8*T.* 1*hhd* 53*gal.* 3*qt.*

(23)
Ans. 89*A.* 2*R.* 37*P.*

(24)
Ans. 975*bu.* 1*pk.* 6*qt.*

(25)
Ans. 124 *cords* 58*ft.* 522*in.*

(26)
Ans. 25 *E. E.* 1*qr.* 3*na.*

(27)
Ans. 79℔ 10ʒ 6ʒ

(28)
Ans. 12ʒ 4ʒ 2ϑ

(29)
Ans. 124 *E. E.* 3*qr.* 3*na.*

(30)
96 *E. F.* 1*qr.* 1*na.*

(31)
Ans. 12*T.* 17*cwt.* 3*qr.*

(32)
Ans. 2*cwt.* 2*qr.* 22*lb.*

(33)
Ans. 69*qr.* 2*lb.* 14*oz.*

(34)
Ans. 134*lb.* 14*oz.* 13*dr.*

(35)
Ans. 10*A.* 2*R.* 18*P.*

(36)
Ans. 37*A.* 2*R.* 34*P.*

(37)
Ans. 147*da.* 21*hr.* 56*min.*

(38)
Ans. 52*hr.* 50*min.* 54*sec.*

(39)
Ans. $8759,625

(40)
Ans. 183666662

(41)
Ans. 6*yr.* 9*mo.* 3*wk.* 11*da.*

(42)
Ans. 88℔ 0ʒ 6ʒ

(43)
Ans. $8,20

(44)
Ans. $39,868

(45)
Ans. $10,626

(46)
Ans. £121 17*s.* 0*d.* 1*far.*

(47)
Ans. 6*yr.* 0*mo.* 0*wk.* 6*da.* 9*hr.* 2*min.*

(48)
6353870 *Ans.*

(49)
Ans. 5747*ft.*

(50)
Ans. $6020

(51)
Ans. $25712808,91

(52)
Ans. $36190

(53)
Ans. 683021

(54)
Ans. 107445034*lbs.*

(55)
Ans. 6274

(56)
Ans. 4*T.* 3*cwt.* 2*qr.* 23*lb.*

(57)
Ans. £19 19*s.* 2*d.* 3*far.*

(58)
Ans. 2299*mi.* 2*fur.* 4*rd.*

(59)
Ans. $199,625

(60)
Ans. $175,875

(61)
Ans. $3,25

(62)
Ans. 19987563

(63)
Ans. 2899248

(64)
Ans. $73675

(65)
Ans. 22815

(66)
Ans. $198,625

(67)
Ans. 80*yr.* 8*mo.* 0*da.* 3*hr.* 30*min.*

(68)
$655,125

(69)
Ans. 249*yr.* 1*mo.* 11*da.*

(70)
Ans. 17877

(71)
Ans. 7310756

(72)
Ans. $62727794

(73)
Ans. $7398

(74)
Ans. $2360

(75)
Ans. 526

(76)
Ans. 6274

(77)
gained $356,35

(78)
A. 3*A.* 2*R.* 39*P.*

(79)
A. 41 *cords* 5 *cord ft.*

(80)
Ans. $3280,105

(81)
Ans. $44161,987

(82)
Ans. $14352,50

(83)
Ans. 2*yr.* 8*mo.* 19*da.*

(84)
Ans. 30*gal.* 2*qt.* 1*pt.*

(85)
50062 *Ans.*

(86)
Ans. 15550

(87)
Ans. 12° 23′ 53″

(88)
Ans. $161,175

(89)
Ans. 2271707

(90)
Ans. 32*yd.* 0*qr.* 2*na.*

(91)
Ans. £950 2*s.* 8*d.*

MULTIPLICATION.

(1)
Ans. 6776368

(2)
Ans. 68653214

(3)
Ans. 3422454

(4)
Ans. 1952883

(5)
Ans. 4354224

(6)
Ans. 1028540646

(7)
Ans. 24668698404

(8)
Ans. $70,84

(9)
Ans. $12517,764

(10)
Ans. $961662,96

(11)
Ans. 201638228149

(12)
Ans. 4281770760

(13)
Ans. 174809600

(14)
Ans. 301144560000

(15)
Ans. 610071000

(16)
Ans. 14783518400

(17)
Ans. £81 6*s.* 8*d.*

(18)
Ans. 24*T.* 7*cwt.* 3*qr.*

(19)
Ans. 118*yd.* 1*ft.* 3*in.*

(20)
Ans. 114° 26′ 15″

(21)
Ans. 56*hhd.* 7*gal.* 2*qt.*

(22)
Ans. 598 *E. F.*

(23)
Ans. 865*T.* 11*cwt.* 3*qr.* 20*lb.*

(24)
Ans. 320*yr.* 2*mo.* 0*wk.* 1*da.* 15*hr.* 12*m.*

(25)
Ans. 4890

(26)
Ans. 234048

(27)
Ans. 4482566

(28)
Ans. 314986464

(29)
Ans. 320021195962

(30)
Ans. 556321146764

(31)
Ans. 1747125213301

(32)
Ans. 2324684880333

(33)
Ans. 71109696492112

(34)
Ans. 90012355857332

(35)
Ans. 549600

(36)
Ans. 670460 ; 6704600

(37)
Ans. 5704900 ; 57049000

(38)
Ans. 4980496000 ; 49804960000

(39)

Ans. 9072040000 ; 907204000000

(40)

Ans. 74040900 ; 740409000

(41)

Ans. 67493600 ; 67493600000

(42)

Ans. 129359360000

(43)

Ans. 13729103000000

(44)

Ans. 664763206000000

(45)

Ans. 8799238229600000

(46)

Ans. 2526426017908695000000

(47)

Ans. 1093689368445084378777040

(48)

Ans. 167144106773595815837 37

(49)

Ans. $2479 \times 25 = \$61975$

(50)

Ans. $15 \times 24 \times 9 = 3240$ miles.

(51)

$125 \times 26 = \$3250$; $96 \times 32 = \$3072$; $3250 + 3072 = \$6322$; $2500 + 1725 = \$4225$; $6322 - 4225 = \$2097$. *Ans.*

(52)

14*yd.* 3*qr.* 2*na.*
9
133*yd.* 3*qr.* 2*na.* *Ans.*

(53)

5*s.* 3*d.* 2*far.*
15
£3 19*s.* 4*d.* 2*far.*

(54)

$\$2{,}48 \times 416 = \$1031{,}68$ *Ans.*

(55)

$8,75 \times 40 = \$350$; $\$9,125 \times 40 = \$365$; $365 - 350 = \$15$ *A.*

(56)

$7cwt.\ 2qr.\ 18lb. = 768lbs.$; $768 \times 11 = 8448lbs.$;
$8448 \times ,06 = \$506,88$ *Ans.*

(57)

$44 \times 36 \times 4 = \$6336$ *Ans.*

(58)

$600 + 570 + 1200 = \$2370$; $3479 - 2370 = \$1109$;
$1109 \times 5 = \$5545$ *Ans.*

(59)

$931324 \times 18 = \$16763832$ *Ans.*

(60)

$20mi.\ 5fur.\ 16rd.$
3
62 0 8
8
$496mi.\ 1fur.\ 24rd.$ *Ans.*

(61)

$4hr.\ 45min.\ 30sec.$
14
$10)66hr.\ 37min.\ 0sec.$
$6da.\ 6hr.\ 37min.$ *Ans.*

(62)

$365 \times 30 \times ,06 = \$657$ *Ans.*

(63)

$118 \times ,62\frac{1}{2} = \$73,75$
$9,875 \times 5 = 49,375$
$\$24,375$ *Ans.*

(64)

$34 + 28 \times 14 = 868$ miles. *Ans.*

(65)

10 ℥ 6 ʒ 2 ℈ 14*grs.*
8
7 ℔ 2 ℥ 7 ʒ 0 ℈ 12*grs.* *Ans.*

(66)

$2bu.\ 3pk.\ 6qt.$
7
$20bu.\ 2pk.\ 2qt.$
20
$411bu.\ 1pk.\ 0qt.$ *Ans.*

(67)
$468 \times 313 = 146484 yds.$ *Ans.*

(68)
$2018 \times 212 = 427816 bar.$ *A.*

(69)
$7 cwt.\ 2 qr.\ 16 lbs. = 766 lbs.$; $766 \times ,11 = \$84,26$, *Ans.*

(70)
$984 \times 245 \times ,07 = \$16875,60$ *Ans.*

(71)

	18*cwt.*	3*qrs.*	21*lbs.* 6
5	13	3	1
2	15	1	5
2*T.*	18*cwt.*	1*qr.*	21*lb.* *Ans.*

(72)
$136 \times 17 = 2312 bu.$; $2312 \times ,42 = \$971,04$ *Ans.*

(73)
$1845 \times 7 = \$12915$; $4752 + 6848 = \$11600$; $528 + 856 = 1384$;
$528 \times 9 = \$4752$; $1845 - 1384 = 461$ barrels left.
$856 \times 8 = \$6848$; $\$12915 - \$11600 = \$1315$, cost of $461 bar.$

(74)
$872 \times 25 \times ,06\frac{1}{2} = \$1417$ *Ans*

(75)
$52770231 \times \$1,25 = \$65962788,75$ *Ans.*

(76)
$25 \times 30 = 750$ days. *Ans.*

(77)
$2700 \times 5 = \$13500$ *Ans.*

(78)
$72 \times 9 \times ,37\frac{1}{2} = \$243$ *Ans.*

(79)
$\$37,565 \times 127 = \$4770,755$ *A.*

(80)

$127 \times 39 = \$4953$; $4953 - 3698 = 1255$; $1255 + 1246 = \$2501$;
$86 \times 43 = \$3698$; $127 - 86 = 41$; $2501 \div 41 = \$61$ *Ans.*

(81)

$75 \times 56 \times .16 = \$672$ *Ans.*

(82)

$46 \times 37 \times 7 = \$11914$ *Ans.*

(83)

1856*yr.*	9*mo.*	4*da.*
1850	4	20
6	4	14
		5
31*yr.*	10*mo.*	10*da.*
		9
286*yr.*	9*mo.*	0*da.* *Ans.*

(84)

$16ft.\ 8in. \times 84 = 84rd.\ 14ft.\ A.$

(85)

$8 \times 2 + 50 = 66$; $58 \times 2 = 116$;
$116 - 66 = 50$ *Ans.*

(86)

5 cords 6 cord feet $\times 4 = 24$ cords. *Ans.*

(87)

$56 \times 25 = \$1400$; $94 \times 32 = \$3008$; $1400 + 3008 = \$4408$;
$56 + 94 \times 30 = \$4500$; $4500 - 4408 = \$92$ *Ans.*

(88)

$12 \times 9 \times 2 = 216$ men. *Ans.*

(89)

$\$25{,}50 \times 4 = \$102$
$\$2{,}125 \times 12 = \$25{,}50$
$\$\ 7{,}25 \times 3 = \$21{,}70$
$\$149{,}20$ *Ans.*

(90)

$326 \times 116 = 37816$ tons. *Ans.*

(91)

$960 \times ,09 = 86{,}40$; $\$4{,}75 \times 12 = \$57$; $\$104{,}90 - 70{,}02 = \$34{,}88$
$148 \times ,12\frac{1}{2} = 18{,}50$; $186 \times ,07 = \$13{,}02$
$\$104{,}90$ $\$70{,}02$

(92)

12*gal.*	2*qt.*	1*pt.*
		14
4*bar.* 32*gal.*	3*qt.*	*Ans.*

(93)

$1gal.\ 2qt.\ 1pt.\ 2gi. = 54gi.$;
$54gi. \times 25000 = 1350000gi.$
$= 669hhd.\ 40gal.\ 2qt.$ *A.*

(94)

$70000 \times 195 = \$13650000$ *Ans.*

(95)

$39 \times 27 = \$1053$; $70 \times 27 \times ,45 = \$850,50$; $1053 - 850,50 = \$202,50$ *Ans.*

(96)

14	pounds of tea,	at 75 cents,	- - -	$10,50
9	" " coffee,	14 " - - - -		1,26
42	" " sugar,	11 " - - - -		4,62
3	" " pepper,	12½ " - - - -		,375
5	" " chocolate,	56 " - - - -		2,80
12	" " candles,	16 " - - - -		1,92
		Amount, -		$21,475

(97)

48	pounds of sugar at 9½ cents a pound, - - - -	$4,56
6	hogs. of molasses, each containing 63 gallons, at 27 cents a gallon, - - - - - - - - - -	102,06
8	casks of rice, 285 lbs. each, at 5 cents a pound,	114,00
9	chests of tea, 86 lbs. each, at 87½ cents a pound,	677,25
4	bags of coffee, each 67 lbs., at 11 cents a pound,	29,48
	Amount, - -	$927,35

(98)

78	chests of tea, at $55,65 per chest, - -	$4340,70
251	bags of coffee, 100 pounds each, at 12½ cents per pound, - - -	3137,50
317	boxes of raisins, at $2,75 per box, - -	871,75
1049	barrels of shad, at $7,50 per barrel, -	7867,50
76	barrels of oil, 32 gallons each, at $1,08 per gal.,	2626,56
	Amount, - -	$18844,01

(99)

10	yards of broadcloth, at $4,37½, - - -	$43,75
75	" " sheeting, " ,09 - - -	6,75
42	" " plaid prints, at ,45 - - -	18,90
5	barrels of Genesee flour, at $7,87½, - - -	39,375
7	pairs of boots, at $1,60 per pair, - - -	11,20
18	bushels of corn, at 72 cents per bushel, - -	12,96
	Amount, - - -	$132,935

(100)

		£	s.	d.
45 yards of broadcloth	at 9s. 6d. - -	21	7	6
56 " "	" 12s. 9¼d. - -	35	15	2
16 " vestings,	" 6s. 8½d. -	5	7	4
24 lbs. colored thread,	" 5s. 4d. - -	6	8	0
72 pairs silk hose,	" 7s. 5¾d. - -	26	18	6
108 yards carpeting,	" 14s. 10d. - -	80	2	0
	Amount, -	£175	18	6

DIVISION.

(1)
Ans. 6579

(2)
Ans. 36842

(3)
Ans. 269368

(4)
Ans. 275155

(5)
Ans. 7948312

(6)
Ans. 1147187

(7)
Ans. 72331642

(8)
Ans. £15 19*s.* 9*d.*

(9)
Ans. 4*A.* 0*R.* 33*P.*

(10)
Ans. 9*yd.* 2*qr.* 1*na.*

(11)
Ans. $79,344

(12)
Ans. $209,728

(13)
Ans. $66862,18

(14)
Ans. 15311409$\frac{2}{48}$

(15)
Ans. 237132

(16)
Ans. 177242

(17)
Ans. 68

(18)
Ans. 44670

(19)
Ans. 275

(20)
Ans. $17,451

(21)
Ans. $3,842$\frac{86}{124}$

(22)
Ans. $1,125

(23)
Ans. $0,375

(24)
Ans. $0,81

(25) *Ans.* \$5,01

(26) *Ans.* \$52,88

(27) *Ans.* 9

(28) *Ans.* 95

(29) *Ans.* \$8

(30) *Ans.* 763521

(31) *Ans.* $407294\frac{1080}{1754}$

(32) *Ans.* $1319513\frac{1842}{3574}$

(33) *Ans.* $125139201\frac{13010}{45705}$

(34) *Ans.* $269577255882\frac{5561}{17493}$

(35) *Ans.* $142437577748\frac{35411}{47143}$

(36) *Ans.* $153959191\frac{2214}{37149}$

(37) *Ans.* $30001000\frac{6347}{57143}$

(38) *Ans.* $131809655\frac{104990}{374567}$

(39) *Ans.* $3003355752\frac{73118}{571007}$

(40) *Ans.* $9948157977\frac{21829}{678957}$

(41) *Ans.* $59085714\frac{84}{121}$

(42) $125812\frac{15785}{57149}$

(43) *Ans.* $119191753\frac{90107}{123456}$

(44)
41)729*A.* 2*R.* 7*P.*
17*A.* 3*R.* 7*P.*

(45)
240)365*da.* 6*hr.*
Ans. 1*da.* 12*hr.* 31*min.* 30*sec.*

(46)
37)1298*mi.* 2*fur.* 33*rd.*
35*mi.* 0*fur.* 29*rd.* *Ans.*

(47)
120)95*hhd.* 6*gal.*
Ans. 0*hhd.* 49*gal.* $3\frac{84}{120}$*qt.*

(48)
105)232*bu.* 3*pk.* 7*qt.*
2*bu.* 0*pk.* 7*qt.* *Ans.*

(49)

725)18306,25

\$25,25 *Aus.*

(50)

7)16*s.* 4*d.*

2*s* 4*d.* *Ans.*

(51)

12)265*mi.* 6*fur.* 16*rd.*

22*mi.* 1*fur.* 8*rd.* *Ans.*

(52)

69*A.* 2*R.* 23*P.*

63 1 7

5

316*A.* 1*R.* 35*P.* *Ans.*

(53)

Ans. \$27,397+

(54)

Ans. 98765

(55)

\$75000÷4=18750; 75000—18750÷5=\$11250 *Ans.*

(56)

54026818÷365=148018$\frac{248}{365}$ *Ans.*

(57)

\$133÷28=\$4,75 *Ans.*

(58)

\$637,50÷51=\$12,50 *Ans.*

(59)

A. 78747600÷104=757188$\frac{48}{104}$

(60)

\$30,875÷19=\$1,625 *A.*

(61)

5×5=25; 9125÷25=365*da.* *Ans.*

(62)

800008 *Ans.*

(63)

10*oz.* 11*pwt.* 12*gr.*=5076*grs.*; 4*pwt.* 12*gr.*=108*grs.*;
5076÷108=47 rings. *Ans.*

(64)

\$67,50÷2=3375*lb.*=1 *T.* 13*cwt.* 3*qr.* *Ans.*

(65)

12 *T.* 38*ft.* 106*in.*÷14=45*c. ft.* 995c. *in.* Ans.

(66)

$285702 \div 9285 = 30\frac{7152}{9285}$ *tons.* *Ans.*

(67)

$942321 \div 213 = 4424\frac{9}{213}$ *vols.* *Ans.*

CONTRACTIONS.

(2)

$28700 \div 4 = 7175$ *Ans.*

(3)

$18400 \div 4 = 4600$ *Ans.*

(4)

$674100 \div 4 = 168525$ *Ans.*

(5)

$307400 \div 4 = 76850$ *Ans.*

(2)

$327 \times 8\frac{1}{3} = 2725$ *Ans.*

(3)

$23744 \times 16\frac{1}{2} = 387321$ *Ans.*

(4)

$34700 \times 127\frac{1}{5} = 4413840$ *Ans.*

(5)

$1272 \times 12\frac{1}{8} = 15423$ *Ans.*

(6)

$9824 \times 272\frac{1}{4} = 2674584$ *Ans.*

(7)

$3828 \times 73\frac{1}{6} = 280082$ *Ans.*

(1)

$38400 \div 8 = 4800$ *Ans.*

(2)

$47600 \div 8 = 5950$ *Ans.*

(3)

$1480000 \div 8 = 185000$ *Ans.*

(4)

$67041800 \div 8 = 8380225$ *Ans.*

(1)

$167925200 \div 3 = 55975066\frac{2}{3}$.

(2)

$148072400 \div 3 = 49357466\frac{2}{3}$.

(3)

$1067551200 \div 3 = 355850400$.

(4)

$444217200 \div 3 = 148072400$.

(1)
$59264000 \div 8 = 7408000$ *Ans.*

(2)
$17593408000 \div 8 = 2199176000$ *Ans.*

(3)
$1940812000 \div 8 = 242601500$ *Ans.*

(4)
$140588000 \div 8 = 17573500$ *Ans.*

(1)
$6350 \times 4 \div 100 = 254$ *Ans.*

(2)
$21345 \times 4 \div 100 = 853\frac{80}{100}$

(3)
$656280 \times 4 \div 100 = 26251\frac{20}{100}$ *Ans.*

(4)
$7278675 \times 4 \div 100 = 291147$ *Ans.*

(5)
$5287215 \times 4 \div 100 = 211488\frac{60}{100}$ *Ans.*

(6)
$12225 \times 8 \div 100 = 978$ *Ans.*

(7)
$10650 \times 8 \div 100 = 852$ *Ans.*

(8)
$11925 \times 8 \div 100 = 954$ *Ans.*

(9)
$1760600 \times 8 \div 100 = 140848$

(10)
Ans. $67500 \times 3 \div 100 = 2025$

(11)
$1308400 \times 3 \div 100 = 39252$

(12)
$15851400 \times 3 \div 100 = 475542$ *Ans.*

(13)

$8072400 \times 3 \div 100 = 242172$ *Ans.*

(14)

$281250 \times 8 \div 1000 = 2250$ *Ans*

(15)

$6015750 \times 8 \div 1000 = 48126$ *Ans.*

(16)

$2026875 \times 8 \div 1000 = 16215$ *Ans.*

(1)

$(2322 \div 2) \div 3 = 387$ *Ans.*

(2)

$(37152 \div 4) \div 6 = 1548$ *Ans.*

(3)

$(19152 \div 6) \div 6 = 532$ *Ans.*

(4)

$(38592 \div 4) \div 12 = 804$ *Ans.*

(5)

$(1145592 \div 8) \div 9 = 15911$ *A.*

(6)

$(185760 \div 8) \div 12 = 1935$ *A.*

(7)

$(115776 \div 8) \div 8 = 1809$ *A.*

(8)

$(463104 \div 12) \div 12 = 3216$ *A.*

(1)

7)416705
9)59529 . . . 2
5)6614 . . . 3
1322 . . . 4

$4 \times 9 + 3 = 39$;
$39 \times 7 + 2 = 275$.
Ans. $1322\frac{275}{315}$.

(2)

3)804106
2)268035 . . . 1
7)134017 . . . 1
11)19145 . . . 2
1740 . . . 5

$5 \times 7 + 2 = 37$; $37 \times 2 + 1 = 75$;
$75 \times 3 + 1 = 226$.
Ans. $1740\frac{226}{462}$.

(3)

$756807 \div 4 \times 8 \times 9 \times 12 = 218\frac{3399}{3456}$. *Ans.*

(4)

$8741659 \div 3 \times 5 \times 7 = 83253\frac{94}{105}$ *Ans.*

(5)

$947043 \div 5 \times 7 \times 11 = 2459\frac{328}{385}$ *Ans.*

(6)

$4704967 \div 11 \times 7 \times 5 \times 3 = 4073\frac{652}{1155}$ *Ans.*

(7)

$71874607 \div 8 \times 7 \times 9 \times 5 \times 3 = 9507\frac{1687}{7560}$ *Ans.*

(1)

$1972654 \div 420000 = 4\frac{292654}{420000}$ *Ans.*

(2)

$1752000 \div 12000 = 146$ *Ans.*

(3)

$73199006 \div 801400 = 91\frac{271606}{801400}$ *Ans.*

(4)

$11428729800 \div 72000 = 158732\frac{25800}{72000}$ *Ans.*

(5)

$36981400 \div 146000 = 253\frac{43400}{146000}$ *Ans.*

(6)

$141614398 \div 63000 = 2247\frac{53398}{63000}$ *Ans.*

(1)

$3245 \div 16\frac{1}{2} = 196\frac{22}{33}$ *Ans.*

(2)

$47804 \div 15\frac{1}{3} = 3117\frac{30}{46}$ *Ans.*

(3)

$870631 \div 14\frac{1}{4} = 61096\frac{52}{57}$ *Ans.*

(4)

$37214 \div 51\frac{1}{6} = 727\frac{369}{306}$ A.

(5)
$87317 \div 9\frac{3}{5} = 9095\frac{25}{46}$ *Ans.*

(6)
$87906 \div 12\frac{4}{7} = 6992\frac{46}{88}$ *Ans.*

(7)
$95675 \div 15\frac{5}{9} = 6150\frac{75}{140}$ *Ans.*

(8)
$71096 \div 17\frac{3}{7} = 4079\frac{34}{123}$ *Ans.*

APPLICATIONS.

(1)
$284 \div 2 = \$142$ *Ans.*

(2)
$51 \div 3 = \$17$ *Ans.*

(3)
$112 \div 8 = \$14$ *Ans.*

(4)
$175 \div 5 = \$35$ *Ans.*

(6)
$129 \times 1\frac{1}{3} = \$172$ *Ans.*

(7)
$96 \times 1\frac{1}{4} = \$120$ *Ans.*

(8)
$25 \times 3 \times 1\frac{1}{6} = \$90$ *Ans.*

(1)
$3742 \times 3{,}25 \div 100 = \$121{,}615$ *Ans.*

(2)
$5400 \times 12{,}50 \div 1000 = \$67{,}50$ *Ans.*

(3)
$\$118{,}9145$ *Ans.*

(1)
$1575 \times 1{,}92 \div 1000 = \$3{,}024$ *Ans.*

(2)
$(3496 \times 7{,}37\frac{1}{2} \div 2) \div 1000 = \$12{,}8915$ *Ans.*

(3)

$1260 \times 4{,}70 \div 1000 = \$5{,}922$; $1260 \times 5{,}12\frac{1}{2} \div 1000 = \$6{,}4575$;
$1260 \times 7{,}30 \div 1000 = \$9{,}198$ *Ans.*

(4)

$5482 \times 3{,}32\frac{1}{2} \div 1000 = \$18{,}22765$ *Ans.*

(1)

$78° \ 55' - 73° \ 42' = 5° \ 13'$ Diff. of Longitude.
$5° \ 13' \times 4 = 20min. \ 52sec.$ Diff. in Time.

(2)

$89° \ 33' - 74° \ 1' = 15° \ 32'$ Diff. of Long. ; $15° \ 32' \times 4$
$= 1hr. \ 2min. \ 8sec.$ Later. *Ans.*

(3)

$12hr. - 11hr. \ 6min. \ 28sec. = 53min. \ 32sec.$; $53min. \ 32sec. \div 4$
$= 13° \ 23'$ Diff. of Long. *Ans.*

(4)

$75° \ 10' - 74° \ 1' = 1° \ 9'$ Diff. of Long. ; $1° \ 9' \times 4$
$= 4min. \ 36sec.$ Diff. in Time. *Ans.*

(5)

$89° \ 2' - 77° \ 2' = 12°$; $12° \times 4 = 48min.$ Diff. in Time.
$9hr. - 48min. = 8hr. \ 12min.$ *Ans.*

(6)

$42min. \ 16sec. \div 4 = 10° \ 34'$ Diff. of Long. *Ans.*

(7)

$2hr. \times 15 = 30°$; $20min. \ 44sec. \div 4 = 5° \ 11'$; $30° + 5° \ 11'$
$= 35° \ 11'$ Diff. of Long. *Ans.*

(8)

$22min.\ 12sec. \div 4 = 5°\ 33'$ Diff. of Long.; $90°\ 15' - 5°\ 33' = 84°\ 42'$; $10hr.\ 40min. - 22min.\ 12sec. = 10hr.\ 17min.\ 48sec.$ *Ans.*

(9)

$8 \times 15° = 120°$ Diff. of Long. *Ans.*

(10)

$15°\ 35' \times 4 = 1hr.\ 2min.\ 20sec.$ Fast. *Ans.*

(1)

$96 \times 1\frac{1}{3} = \$128$ *Ans.*

(2)

$1066bu.\ 2pk. \div 474 = 2bu.\ 1pk.$ *Ans.*

(3)

$\$4{,}32 \times 12\frac{1}{3} = \$53{,}28$ *Ans.*

(4)

$\$36 \div ,45 = 80bu.$; $80bu. \div 2\frac{1}{2} = 32bar.$ *Ans.*

(5)

$1236 \times 375 + 184 = 463684$ *Ans.*

(6)

$60000000 \div 24 \div 60 = 41666\frac{4}{6}$ gallons. *Ans.*

(7)

$23191876 \div 400 = 57979\frac{276}{400}$ *Ans.*

(8)

$25000 \div 45 = 555\frac{25}{45}$ *Ans.*

(9)

$2mo.\ 3wk.\ 6da. \times 25 \div 10 = 7mo.\ 1wk.\ 4\frac{1}{2}da.$ *Ans.*

(10)

$1200-640=560$; $6720\div 560=12$ years. *Ans.*

(11)

$20000000\div 80=250000m.=6mo.\ 0wk.\ 5da.\ 14hr.\ 40m.$

(12)

$47400\div 3160=\$15$; $11475\div 15=765bar.$ *Ans.*

(13)

$96\times 6\times 12\frac{1}{2}=\$72.$ *Ans.*

(14)

$1000\times ,005=\$5.$ *Ans*

(15)

$\$9{,}50\times 85\frac{1}{2}=\$812{,}25.$ *Ans.*

(16)

$1hhd.\ 2gal.\ 3qt.=263qts.$; $263\times ,56\frac{1}{4}=\$147{,}9375.$ *Ans.*

(17)

$1s.\ 6d.=18d.$; $196\times 18d.=3528d.=£14\ 14s.$ *Ans.*

(18)

$2s.\ 8d.=32d.$; $1246\times 32d.=39872d.=£166\ 2s.\ 8d.$ *Ans.*

(19)

$£2\ 16s.=56s.=672d.$; $672d.\div 112=6d.$ *Ans.*

(20)

$1426\times \$4{,}87\frac{1}{2}=\$6{,}95175.$ *Ans.*

(21)

$3840\times \$2{,}25=\$8{,}64.$ *Ans.*

(22)

$124\times 2\frac{1}{4}\div 3=\$93.$ *Ans.*

(23)

$\$11812{,}50\div 1500=\$7{,}875.$ *Ans.*

(24)

$\$142{,}02\div 789=,18cts.$ A

(25)

$(16200 \div 25) \div 18 = 36$. *Ans.*

(26)

$1005928 \div 92 = 10934 pwt. = 45 lb.\ 6 oz.\ 14 pwt.$ *Ans.*

(27)

$\$4200 \div 84 = \$50$. *Ans.*

(28)

$640 \times 15 = \$9600$; $160 \times 20 = \$3200$; $240 \times 18 = \$4320$;
$\$3200 + \$4320 + \$4560 = \$12080$; $\$12080 - \$9600 = \$2480$

$160 + 240 = 400$ acres; $640 - 400 = 240$ acres;
$4560 \div 240 = \$19$. *Ans.*

(29)

$60 + 48 = 108$; $108 \times 2 = 216$; $216 \times 12 \times 2\frac{1}{2} = 6480$ *cu. ft. A.*

(30)

$325640 \times \$2{,}37\frac{1}{2} \div 1000 = \$773{,}395$. *Ans.*

(31)

$684 \times \$6{,}20 \div 1000 = \$4{,}2408$. *Ans.*

(32)

$786 \times \$2{,}72\frac{1}{2} \div 100 = \$16{,}7025$. *Ans.*

(33)

$40 ft. = 480 in.$; $16 ft. = 192 in.$; $480 \times 192 = 92160 sq.\ in.$;
$92160 \div 24 = 3840$ shingles on one side; $3840 \times 2 = 7680$ shingles on both sides.

(34)

$14 lb.\ 8 oz.\ 12 pwt.\ 3 gr. \div 9 = 1 lb.\ 7 oz.\ 12 pwt.\ 11 gr.$ *Ans.*

(35)

$2688 \div 320 = \$8{,}40$ cost; $\$8{,}40 + \$1{,}60 = \$10$. *Ans.*

(36)

$449bu.\ 1pk.\ 2qt. \div 182 = 2bu.\ 1pk.\ 7qt.$ *Ans.*

(37)

$750 \times \$7{,}25 = \$5437{,}50$; $\$5437{,}50 - \$4875 = \$562{,}50$ whole gain; $\$562{,}50 \div 750 = \$0{,}75$ gain on each barrel. *Ans.*

(38)

$169 \div 1{,}625 = 104$ sheep. *Ans.*

(39)

$267{,}75 \div 6{,}375 = 42$ days. *Ans.*

(40)

$58lb. = 928oz.$; $3lb.\ 10oz. = 58oz.$; $928 \div 58 = 16$ cannisters. *A.*

(41)

$1358gal.\ 2qt. \div 26 = 52gal.\ 1qt.$ *Ans.*

(42)

$942312 \div 213 = 4424$. *Ans.*

(43)

$3801{,}65 - 3475{,}25 = 326{,}40$ whole gain; $326{,}40 \div 3{,}40 = 96$ acres. *Ans.*

(44)

$43313281 + 6500000 + 8500000 = 58313281$;
$58313281 - 57715000 = \$598281$. Ans.

(45)

$12ft.=144in.$; $16ft.\ 6in.=198in.$; 264 miles$=16727040in.$; $16727040\div144=116160$ times ; $16727040\div198=84480$ times ; $116160-84480=31680$ times. *Ans.*

(46)

$9\times4\frac{1}{3}=39sq.\ mi.$; $39\times640=24960\ sq.\ acres$; $24960\div192=130$ farms. *Ans.*

(47)

$4093850\div34337=119\frac{7747}{34337}$ *Ans.*

(48)

\$305780253 − \$261382960 = \$44397293 *Ans.*

(49)

$89°\ 2'-75°\ 10'=13°\ 52'$; $13°\ 52'\times4=55m.\ 28sec.$ Diff. in Time ; $12hr.-55m.\ 28sec.=11hr.\ 4m.\ 32scc.$ *Ans.*

(50)

$8hr.\times15=120°$; $30min.\div4=7°\ 30'$; $120°+7°\ 30'=127°\ 30'$ *Ans.*

(51)

$23min.\div4=5°\ 45'$ Diff. of Long. ; $73°\ 20'+5°\ 45'=79°\ 5'$ A's Long. ; $9hr.42m.-23m.=9hr.\ 19m.$ P.M. B's time.

(52)

120 cords 7 cord feet 5 $c.\ ft.\div11=10$ cords 7 cord feet 15 $c.\ ft.$

(53)

$16cwt.\ 2qr.\ 11lb.\ 10oz.\div9=1cwt.\ 3qr.\ 9lb.\ 10oz.$ *Ans.*

(54)

\$625,40 + \$110,125 = \$735,525 ; \$900 − \$735,525 = \$164,475

(55)

1775	4	19
1492	10	11
282*yr.*	6*mo.*	8*da.*

Ans.

(56)

(1*pt.* 3*gi.*)×18=3*gal.* 3*qt.* 1*pt.* 1*gi.* ; 6*gal.*×3=18*gal.*; (2*qt.* 1*pt.* 3*gi.*)×48=34*gal.* 2*qt.* ; 3*gal.* 3*qt.* 1*pt.* 1*gi.*+18*gal.* +34*gal.* 2*qt.*=56*gal.* 1*qt.* 1*pt.* 2*gi.* ; 63*gal.*— 56*gal.* 1*qt.* 1*pt.* 2*gi.* =6*gal.* 2*qt.* 0*pt.* 2*gi.* *Ans.*

(57)

753689*yd.*÷5½=137034*rd.* 2*yd.* ; 137034*rd.*÷40 =3425*fur.* 34*rd.* ; 3425*fur.*÷8=428*mi.* 1*fur.* ; 428*mi.*÷ 69½=6*Deg.* 11*mi.* ; 6*Deg.* 11*mi.* 1*fur.* 34*rd.* 2*yd.* *Ans.*

(58)

189*mi.*×8+3*fur.*=1515*fur.*; 1515*fur.*×40+6*rd.*=60606*rd.*; 60606*rd.*×16½+1*ft.*=1000000*ft.* *Ans.*

(59)

768÷24=32 rods. ; 32*rd.*×48×9=13824 rods. *Ans.*

(60)

7913576÷209=37864 ; 37864—1764=36100 *Ans.*

(61)

146*mi.* 7*fur.* 14*rd.* 14*ft.*÷5=29*mi.* 3*fur.* 2*rd.* 16*ft.* *Ans.*

(62)

$17712,50÷325=$54,50 ; 545÷54,50=10 acres. *Ans.*

(63)

4+5=$9 ; 324÷9=36 yards. Ans.

(64)

$68yd.\ 3qr. \div 4 = 17yd.\ 0qr.\ 3na.$; $(17yd.\ 0qr.\ 3na.) \div 5 = 3yd.\ 1qr.\ 3na.$ *Ans.*

(65)

$18d. + 12d. + 10d. = 40d.$; £5 10s. $= 1320d.$; $1320 \div 40 = 33$ of each. *Ans.*

(66)

$20936468 \div 1585 = 13209 +$ *Ans*

(67)

$72 \times 12 = 864$; $6 \times 12 = 72$; $864 - 72 = 792$ eggs left; $792 \times 1\frac{1}{2} =$ \$11,88 *Ans.*

(68)

$365\frac{1}{4} \times 50 = 18262\frac{1}{2}$ days; $18262\frac{1}{2} \times 45m. = 821812\frac{1}{2}m.$; $821812\frac{1}{2}m. = 1yr.\ 205da.\ 10hr.\ 52m.\ 30sec.$ *Ans.*

(69)

1858*yr.*	1*mo.*	10*da.*	15*hr.*
1832	6	24	6
25*yr.*	6*mo.*	16*da.*	9*hr.*

Ans.

(70)

$408434 \times \$10{,}25 = \$4186448{,}50$; $2550092 \times \$2{,}12\frac{1}{2} = \$5418945{,}50$; $1048540 \times \$0{,}94 = \$985627{,}60$; $\$4186448{,}50 + \$5418945{,}50 + \$985627{,}60 = \$10591021{,}60$ *Ans.*

(71)

$85 \times 5 = \$425$; $25 \times 22 = \$550$; $150 \times 2 = \$300$; $5000 + 425 + 550 + 110 + 300 + 45 + 174 + 450 + 380 = \$7434$; $\$7434 \div 3 = \$2478$ widow's share; $7434 - 2478 = \$4956$; $4956 \div 4 = \$1239$ each child's share. *Ans.*

(72)

$241200000 \div 26800000 = \$9.$

(73)

$55ft. = 660in.$; $16ft. = 198in.$; $660 \times 198 = 130680$ *sq. in.*; $\frac{1}{3}$ of $15in. = 5in.$; $5in. \times 4in. = 20sq.\ in.$ for each shingle; $130680 \div 20 = 6534$ shingles for one side; $6534 \times 2 = 13068$ shingles for both sides. *Ans.*

(74)

$77° 2' + 30° 45' = 107° 47'$ Diff. in Long.; $107° 47' \times 4 = 7hr.\ 11m.\ 8sec.$ Diff. in time. *Ans.*

(75)

$6hr. + 7hr.\ 11m.\ 8sec. = 13hr.\ 11m.\ 8sec.$ $= 1o'c.\ 11m.\ 8sec.$ *P. M.* *Ans.*

(76)

$3hr.\ 12m. + 1hr.\ 44m. = 4o'c.\ 56m.$ time at the place of observation; $1hr. \times 15 = 15°$; $44m. \div 4 = 11°$; $15° + 11° = 26°$ Diff. of Long. *Ans.*

(77)

$45 - 25 = 20gal.$; $960 \div 20 = 48$ hours. *Ans.*

(78)

$\$2180 - \$500 = \$1680$; $1680 \div 840 = \$2$. *Ans.*

(79)

$6500500 \times ,50 = \$3250250$; $3250250 \div 750 =$ $4333\frac{2}{3}$ school houses. *Ans.*

(80)

$30 \times ,37\frac{1}{2} = \$11,25$; $45 \times 6 = \$2,70$; $60 \times ,06\frac{1}{2} = \$3,90$; $\$2,70 + 3,90 = \$6,60$; $11,25 - 6,60 = \$4,65$; $4:65 \div ,10 = 46\frac{1}{2}lbs.$ A.

(81)

12*mi.* 3*fur.* 20*rd.*=3980*rd.*; 174*mi.* 1*fur.*=55720*rd.*; 55720÷3980=14 days. *Ans.*

(82)

2*bar.* 12*gal.* 2*qt.*×12=28*bar.* 6*gal.* *Ans.*

(83)

550*pt.*=2*bar.* 5*gal.* 3*qt.*; 400*qt.*=3*bar.* 5*gal.* 2*qt.*; 350 two quarts = 5*bar.* 17*gal.* 2*qt.*; 375 three quarts = 8*bar.* 29*gal.* 1*qt.*; 150*gal.*=4*bar.* 24*gal.*; 2*bar.* 5*gal.* 3*qt.*+3*bar.* 5*gal.* 2*qt.*+5*bar.* 17*gal.* 2*qt.*+8*bar.* 29*gal.* 1*qt.*+4*bar.* 24*gal.* =24*bar* 19*gal.* *Ans.*

(84)

18×16=288*sq. ft.*; 288×2=576*sq. ft.* in both; 576÷9 =64*sq. yd.*; 64×\$1,33$\frac{1}{3}$=\$85,33$\frac{1}{3}$ *Ans.*

(85)

22×2=44; 16×2=32; 44+32=76*ft.*; 76×9=684*sq. ft.*; 10*yd.*=30*ft.*; 30×2=60*sq. ft* ; 684*sq. ft.*÷60*sq. ft.* =11$\frac{2}{5}$ rolls. *Ans.*

(86)

1*mi.* 4*fur.* 20*rd.*=500 rods; If to gain 5 rods he must travel 25 rods, to gain 500 rods he must travel as many times 25 rods as 5 rods is contained times in 500 rods, which is 100; therefore, he must travel 100 times 25 rods = 2500 rods = 7*mi.* 6*fur.* 20*rd.* *Ans.*

(87)

\$1,75×500=\$875,00; 875,00÷,05=17500*lbs.*; 17500÷2*lb* =8750*lbs.* *Ans.*

(88)

$12,875 \times 7 = \$90,125$ cost of the whole; $7-2=5$;
$\$90,125 \div 5 = \$18,025$ what he received per barrel. *Ans.*

(89)

$\$26250 - \$18750 = \$7500$ whole gain; $7500 \div 3$
$= 2500$ barrels. *Ans.*

(90)

$(964bu.\ 2pk.\ 4qt.) \div 2 = 482bu.\ 1pk.\ 2qt.$ the first one's share;
$(482bu.\ 1pk.\ 2qt.) \div 3 = 160bu.\ 3pk.\ 0qt.\ 1\frac{1}{2}pt.$ 2d one's share.
$482bu.\ 1pk.\ 2qt. + 160bu.\ 3pk.\ 0qt.\ 1\frac{1}{2}pt. = 643bu.\ 0pk.\ 2qt.\ 1\frac{1}{2}pt.$;
$964bu.\ 2pk.\ 4qt. - 643bu.\ 0pk.\ 2qt.\ 1\frac{1}{2}pt. = 321bu.\ 2pk.\ 1qt.\ \frac{2}{3}pt.$ 3d share.

(91)

70° 25′	105° 30′ 56″	156° 26′ 36″
46° 50′	10° 5′ 40″	115° 36′ 36″
39° 11′ 36″	115° 36′ 36″ West.	40° 50′ 00″ East.
156° 26′ 36″ East.		

$40° 50' + 77° = 117° 50' = 7070'$; $3° 20' = 200'$; $7070' \div 200'$
$= 35\frac{7}{20}$ days. *Ans.*

(92)

$\$25000 \div 125 = \$200$, one share; $\$200 \times 12 = \$2400$ Captain's share; $\$200 \times 2 \times 5 = 2000$, the Lieutenants' shares; $\$200 \times 6 \times 3 = \$3600$, the Midshipmen's shares; $2400 + 2000 + 3600$
$= \$8000$; $25000 - 8000 = \$17000$; $17000 \div 85$
$= \$200$, each sailor's share. *Ans.*

(93)

$1hr. = 15°$; $5m.\ 44sec. \div 4 = 1°\ 26'$; $15° + 1°\ 26'$
$= 16°\ 26'$ Diff. in Long.; $71°\ 4' + 16°\ 26' = 87°\ 30'$ *Ans.*

(94)

$8hr.\ 27m.\ 30sec. + 1hr.\ 5m.\ 44sec. = 9hr.\ 33m.\ 14sec.$ A.M.

(95)

$12hr.-1hr.\ 5m.\ 44sec.=10hr.\ 54m.\ 16sec.$ *Ans.*

(96)

$1hr.$ in time $= 15°$; and $16m.=4°$; $15°+4°=19°$ *Ans.*

(97)

$12\times16\times20=3840\ E.\ E.$; $3840\times5\div4=4800yd.$ *Ans.*

(98)

$24lb.\ 4oz.\ 6pwt.\ 18grs.=140322gr.$; $11pwt.\ 9gr.=273gr.$; $140322\div273=514$ eagles. *Ans.*

(99)

$740\times2=\$1480$; $\$3284{,}82-\$1480=\$1804{,}82$; $\$1804{,}82\div\$1{,}42=1271bu.$; $1271+740=2011$ bushels. *Ans.*

(100)

He paid \$8968 for all the flour: to gain \$1060, he must receive $8968+1060=\$10028$; then, $\$10028-\$2618$ (what he received on the first sale,)$=\$7410$, what he must sell the remainder for.

(101)

$105A.\ 2R.\ 20P.=16900P.$; $1\times16900=\$16900$; $16900\times1hr.$ $=16900$ hours $=1yr.\ 338da.\ 22hr.$ *Ans.*

PROPERTIES OF NUMBERS.

(1)

3×3; 2×5; $2\times2\times3$; 2×7; $2\times2\times2\times2$; $3\times3\times2$; $2\times2\times2\times3$; $3\times3\times3$; $2\times2\times7$. *Ans.*

(2)

$2\times3\times5$; 2×11; $2\times2\times2\times2\times2$; $3\times3\times2\times2$; 2×19; $2\times2\times2\times5$; $3\times3\times5$; 7×7. *Ans.*

(3)

$2\times5\times5$; $2\times2\times2\times7$; 2×29; $2\times2\times3\times5$; $2\times2\times2\times2$
2×2; $2\times3\times11$; $2\times2\times17$; $2\times5\times7$; $2\times2\times2\times3\times3$.

(4)

$2\times2\times19$; $2\times3\times13$; $2\times2\times2\times2\times5$; 2×41; $2\times2\times3\times7$;
2×43; $2\times2\times2\times11$; $2\times3\times3\times5$. *Ans.*

(5)

$2\times2\times23$; 2×47; $2\times2\times2\times2\times2\times3$; $2\times7\times7$; $3\times3\times11$;
$2\times2\times5\times5$; $2\times3\times17$; $2\times2\times2\times13$. *Ans.*

(6)

$3\times5\times7$; 2×53; $2\times2\times3\times3\times3$; $2\times5\times11$; 5×23;
$2\times2\times29$; $2\times2\times2\times3\times5$; $5\times5\times5$. *Ans.*

(7)

2×151; 5×61; $2\times2\times151$; $5\times5\times5\times7$; $3\times5\times5\times13$;
5×131. *Ans.*

(8) *Ans.* $5\times3\times2$.

(9) *Ans.* $2\times3\times7$.

(10) *Ans.* $3\times5\times7$.

(11) *Ans.* $2\times3\times7$

(12) *Ans.* 2.

(13) *Ans.* $2\times3\times5\times7$

GREATEST COMMON DIVISOR.

(2) $2\times3\times3=18$.

(3) $2\times2\times3=12$.

(4) 5.

(5) $2\times3=6$.

(6) *Ans.* $2\times5=10$.

(7) *Ans.* $2\times2\times7=28$.

(8) *Ans.* $7\times2=14$.

(1) *Ans.* 16.

(2) *Ans.* 7.

(3) *Ans.* 22.

(4) *Ans.* 124.

(5)

Ans. 62.

(6)

Ans. 81.

(7)

It is plain that the number of bushels in each load must be the greatest common divisor of 315 and 810. That divisor is 45. *Ans.*

(8)

The question is, what extent of ground is that which will be contained an exact number of times in the two tracts: what is their greatest common divisor? *Ans.* 25 acres.

(9)

There are 1004 feet on one street, and 744 on the other. The panels belong to each front, and hence, the length of each must be the greatest common divisor of the two sides: viz., 12 feet. *Ans.*

(10)

The greatest common divisor of the three numbers will be the number of bushels to be put into each bag. That divisor is 3. *Ans.*

(11)

If each invests his whole money, the price for each cow must be a common divisor of the three sums, \$286, \$462, and \$638: the common divisor is 22.

$286 \div 22 = 13$, A bought; $462 \div 22 = 21$, B bought; $638 \div 22 = 29$, C bought. *Ans.*

LEAST COMMON MULTIPLE.

(1)

5)4	9	10	15	18	20	21
3)4	9	2	3	18	4	21
2)4	3	2	1	6	4	7
3)2	3	1	1	3	2	7
2)2	1	1	1	1	2	7
1	1	1	1	1	1	7

$5 \times 3 \times 2 \times 3 \times 2 \times 7 = 1260$ *Ans.*

(2)

5)8	9	10	12	25	32	75	80
3)8	9	2	12	5	32	15	16
2)8	3	2	4	5	32	1	16
2)4	3	1	2	5	16	1	8
2)2	3	1	1	5	8	1	4
2)1	3	1	1	5	4	1	2
1	3	1	1	5	2	1	1

$5\times3\times2\times2\times2\times2\times3\times5\times2=7200$ *Ans.*

(3) *Ans.* 1260.

(4) *Ans.* 1008.

(5) *Ans.* 10500.

(6) *Ans.* 10800.

(7) *Ans.* 540.

(8) *Ans.* 420.

(9) *Ans.* 336.

(10) *Ans.* 1176.

(11)

3)9	12	16
2)3	4	16
2)3	2	9
3	1	4

$144\div 9=16$ days, A's time;
$144\div 12=12$, B's time;
$144\div 16=9$, C's time. *Ans.*

$3\times2\times2\times3\times4=144$ rods.

(12)

$1680; 112 men at $15; 105 at $16; 80 at $21; 70 at $24.

(13)

210 bushels. It would fill the bags 105 times; the barrels 70 times; the boxes 30 times; and the hogsheads 14 times.

(14)

$300\div15=20$ days, A's time to go around it; $300\div20=15$ days, B's; $300\div25=12$ days, C's; $300\div30=10$ days, D's. The least common multiple of 20, 15, 12, 10 is $60=$the number of days before they all come together again.

$60\times15\div300=3$, the number of times A will travel around it;
$60\times20\div300=4$, B's number of times;
$60\times25\div300=5$, C's number of times;
$60\times30\div300=6$, D's.

CANCELLATION.

(1)

	2
	4 2
8	8
	13
14	7
26	16
	32 *Ans.*

(2)

6	42
4	3
15	25 5
28	12
4	15

$3\frac{3}{4}$ *Ans.*

(3)

5	125
36	60
120	24
25	42 14
	14 *Ans.*

(4)

11	44 4
13 39	18 6
7	26
2	14
13	624

48. *Ans.*

(5)

57	240 10
24	8 4
3 15	114 2
3 6	5
9	80

$8\frac{8}{9}$. *Ans.*

(6)

3 21	46 2
23	49 7
3	14

$4\frac{2}{3}$. *Ans.*

(7)

96	192 2
22	88 4

8. *Ans.*

(8)

5 40	42 7
18	72
9 27	
45	7

$\frac{7}{45}$. *Ans.*

(9)

5 175	240 16
56	441
27	16 2
5	32

$6\frac{2}{5}$. *Ans.*

(10)

560	840 3
32	64
31	124
4	9

27. *Ans.*

(11)

	18 9
14	7

9 dozens. *A.*

(12)

	40 4
	5
50	9

36*lbs.* *Ans.*

(13)

	1,84 46
48	12

Ans. 46-bushels.

(14)

56	175
25	4
	8

Ans. 4 firkins.

(15)

	10
3 12	20 5
3	50

Ans. $16\frac{2}{3}$ days.

(16)

$\$,\$\emptyset$ | $1\emptyset,\$\emptyset$
$3\emptyset$ | $9\emptyset$ 8

Ans. 8 pieces.

(17)

,87+,60+,45=1,92.

2 $1\emptyset$ | $1,9\$$ | $49\$$ 41
| $1,\$4$ 23
2 | 943

$471\frac{1}{2}$ bushels. *Ans.*

(18)

| $2\$\emptyset$
7 | $4\$$ 6

Ans. | 15 barrels.

(19)

$4\emptyset$ | $24\$4$ 207
$12\emptyset$ 30

Ans. | 6210 bushels.

(20)

| $1\$$ 3
4 $1\emptyset$ | 9
4 | 27

Ans. $6\frac{3}{4}$ bushels.

(21)

| 14 7
2 $4\emptyset$ | $\emptyset$
$1\emptyset$ 5
2 | 35

Ans. $17\frac{1}{2}$ bushels.

(22)

| $2\$$ 3
4 $3\emptyset$ | 15
4 | 35

Ans. $11\frac{1}{4}$ days.

(23)

2 $7\$$ | 4
$2\emptyset$ | $1\$$ 3
3
$4\$$
2 | 9

Ans. $4\frac{1}{2}$ boxes.

OF FRACTIONS.

(1)

Eight-ninths; seven-twelfths; five-thirds; six-fifteenths; twenty-ninths; sixteen-sevenths; eighteen one-hundred-fourths.

(2)

Ans. $\frac{15}{19}$; $\frac{37}{49}$.

(3)

Ans. $\frac{27}{40}$; $\frac{95}{40}$; $\frac{106}{40}$; $\frac{87}{40}$; $\frac{41}{40}$.

(4)

A. $\frac{45}{68}$; $\frac{56}{68}$; $\frac{65}{68}$; $\frac{95}{68}$; $\frac{37}{68}$.

(5)

A. $\frac{9}{90}$; $\frac{87}{90}$; $\frac{75}{90}$; $\frac{65}{90}$; $\frac{85}{90}$; $\frac{90}{90}$; $\frac{100}{90}$.

(1)

$\frac{3}{8}\times 6=\frac{18}{8}$; $\frac{3}{8}\times 7=\frac{21}{8}$. *Ans.*

(2)

$\frac{7}{8}\times 4=\frac{28}{8}$; $\frac{7}{8}\times 9=\frac{63}{8}$. *Ans.*

(3)

$\frac{5}{31}\times 11=\frac{55}{31}$; $\frac{5}{31}\times 12=\frac{60}{31}$. *Ans.*

(4)

$\frac{7}{25}\times 12=\frac{84}{25}$; $\frac{7}{25}\times 14=\frac{98}{25}$. *Ans.*

(5)

$\frac{47}{15}\times 3=\frac{141}{15}$; $\frac{47}{15}\times 4=\frac{188}{15}$. *Ans.*

(6)

$\frac{14}{19}\times 7=\frac{98}{19}$; $\frac{14}{19}\times 9=\frac{126}{19}$. *Ans.*

(7)

$\frac{47}{28}\times 5=\frac{235}{28}$; $\frac{47}{28}\times 10=\frac{470}{28}$. *Ans.*

(8)

$\frac{27}{29}\times 3=\frac{81}{29}$; $\frac{27}{29}\times 11=\frac{297}{29}$. *Ans.*

(1)

$\frac{5}{8}\times 2=\frac{5}{4}=1\frac{1}{4}$; $\frac{5}{8}\times 4=\frac{5}{2}=2\frac{1}{2}$. *Ans.*

(2)

$\frac{17}{16}\times 8=\frac{17}{2}=8\frac{1}{2}$; $\frac{17}{16}\times 4=\frac{17}{4}=4\frac{1}{4}$; $\frac{17}{16}\times 2=\frac{17}{8}=2\frac{1}{17}$. *Ans.*

(3)

$\frac{9}{24}\times 2=\frac{9}{12}$; $\frac{9}{24}\times 3=\frac{9}{8}$; $\frac{9}{24}\times 4=\frac{9}{6}$; $\frac{9}{24}\times 6=\frac{9}{4}$; $\frac{9}{24}\times 8=\frac{9}{3}$.

(4)

$\frac{7}{30}\times 6=\frac{7}{5}$; $\frac{7}{30}\times 5=\frac{7}{6}$; $\frac{7}{30}\times 10=\frac{7}{3}$; $\frac{7}{30}\times 15=\frac{7}{2}$. *Ans.*

(5)

$\frac{17}{48}\times 2=\frac{17}{24}$; $\frac{17}{48}\times 3=\frac{17}{16}$; $\frac{17}{48}\times 4=\frac{17}{12}$; $\frac{17}{48}\times 6=\frac{17}{8}$;
$\frac{17}{48}\times 8=\frac{17}{6}$; $\frac{17}{48}\times 12=\frac{17}{4}$; $\frac{17}{48}\times 16=\frac{17}{3}$; $\frac{17}{48}\times 24=\frac{17}{2}$. *Ans.*

(6)

$\frac{6}{40}\times 2=\frac{6}{20}$; $\frac{6}{40}\times 4=\frac{6}{10}$; $\frac{6}{40}\times 5=\frac{6}{8}$; $\frac{6}{40}\times 10=\frac{6}{4}$; $\frac{6}{40}\times 20=\frac{6}{2}$.

(7)

$\frac{7}{35}\times 7=\frac{7}{5}$; $\frac{7}{35}\times 5=\frac{7}{7}$. *Ans.*

(8)

$\frac{6}{42}\times 21=\frac{6}{2}$; $\frac{6}{42}\times 6=\frac{6}{7}$; $\frac{6}{42}\times 7=\frac{6}{6}$; $\frac{6}{42}\times 3=\frac{6}{14}$; $\frac{6}{42}\times 2=\frac{6}{21}$.

(9)

$\frac{19}{36}\times 2=\frac{19}{18}$; $\frac{19}{36}\times 3=\frac{19}{12}$; $\frac{19}{36}\times 4=\frac{19}{9}$; $\frac{19}{36}\times 6=\frac{19}{6}$;
$\frac{19}{36}\times 9=\frac{19}{4}$; $\frac{19}{36}\times 12=\frac{19}{3}$. *Ans.*

(1)

$\frac{16}{19} \div 2 = \frac{8}{19}$; $\frac{16}{19} \div 4 = \frac{4}{19}$; $\frac{16}{19} \div 8 = \frac{2}{19}$; $\frac{16}{19} \div 16 = \frac{1}{19}$. *Ans.*

(2)

$\frac{14}{11} \div 2 = \frac{7}{11}$; $\frac{14}{11} \div 7 = \frac{2}{11}$; $\frac{14}{11} \div 14 = \frac{1}{11}$. *Ans.*

(3)

$\frac{20}{19} \div 2 = \frac{10}{19}$; $\frac{20}{19} \div 5 = \frac{4}{19}$; $\frac{20}{19} \div 4 = \frac{5}{19}$; $\frac{20}{19} \div 10 = \frac{2}{19}$. *Ans.*

(4)

$\frac{60}{26} \div 5 = \frac{12}{26}$; $\frac{60}{26} \div 6 = \frac{10}{26}$; $\frac{60}{26} \div 10 = \frac{6}{26}$; $\frac{60}{26} \div 15 = \frac{4}{26}$; $\frac{60}{26} \div 20 = \frac{3}{26}$. *Ans.*

(5)

$\frac{18}{19} \div 2 = \frac{9}{19}$; $\frac{18}{19} \div 3 = \frac{6}{19}$; $\frac{18}{19} \div 6 = \frac{3}{19}$; $\frac{18}{19} \div 9 = \frac{2}{19}$. *Ans.*

(6)

$\frac{24}{25} \div 3 = \frac{8}{25}$; $\frac{24}{25} \div 6 = \frac{4}{25}$; $\frac{24}{25} \div 8 = \frac{3}{25}$; $\frac{24}{25} \div 12 = \frac{2}{25}$. *Ans.*

(7)

$\frac{27}{29} \div 3 = \frac{9}{29}$; $\frac{27}{29} \div 9 = \frac{3}{29}$; $\frac{27}{29} \div 27 = \frac{1}{29}$. *Ans.*

(8)

$\frac{54}{59} \div 6 = \frac{9}{59}$; $\frac{54}{59} \div 9 = \frac{6}{59}$; $\frac{54}{59} \div 27 = \frac{2}{59}$; $\frac{54}{59} \div 54 = \frac{1}{59}$. *Ans.*

(1)

$\frac{3}{4} \div 6 = \frac{3}{24}$; $\frac{3}{4} \div 7 = \frac{3}{28}$; $\frac{3}{4} \div 8 = \frac{3}{32}$. *Ans.*

(2)

$\frac{4}{9} \div 5 = \frac{4}{45}$; $\frac{4}{9} \div 4 = \frac{4}{36}$; $\frac{4}{9} \div 9 = \frac{4}{81}$. *Ans.*

(3)

$\frac{14}{17} \div 3 = \frac{14}{51}$; $\frac{14}{17} \div 4 = \frac{14}{68}$; $\frac{14}{17} \div 12 = \frac{14}{204}$. *Ans.*

(4)

$\frac{30}{47} \div 6 = \frac{30}{282}$; $\frac{30}{47} \div 8 = \frac{30}{376}$; $\frac{30}{47} \div 11 = \frac{30}{517}$. *Ans.*

(5)

$\frac{15}{17} \div 7 = \frac{15}{119}$; $\frac{15}{17} \div 5 = \frac{15}{85}$; $\frac{15}{17} \div 3 = \frac{15}{51}$. *Ans.*

(6)

$\frac{14}{27} \div 7 = \frac{14}{189}$; $\frac{14}{27} \div 8 = \frac{14}{216}$; $\frac{14}{27} \div 6 = \frac{14}{162}$. *Ans.*

(7)

$\frac{25}{19} \div 3 = \frac{25}{57}$; $\frac{25}{19} \div 7 = \frac{25}{133}$; $\frac{25}{19} \div 11 = \frac{25}{209}$. *Ans.*

(8)

$\frac{11}{15} \div 8 = \frac{11}{120}$; $\frac{11}{15} \div 4 = \frac{11}{60}$; $\frac{11}{15} \div 10 = \frac{11}{150}$. *Ans.*

(1)

Ans. $\frac{28}{32}$; $\frac{42}{48}$; $\frac{35}{40}$.

(2)

Ans. $\frac{40}{55}$; $\frac{64}{88}$; $\frac{72}{99}$; $\frac{88}{121}$

(3)

Ans. $\frac{112}{133}$; $\frac{128}{152}$; $\frac{144}{171}$.

(4)

Ans. $\frac{70}{145}$; $\frac{112}{232}$; $\frac{84}{174}$; $\frac{168}{348}$.

(5)

Ans. $\frac{46}{50}$; $\frac{69}{75}$; $\frac{92}{100}$; $\frac{115}{125}$.

(1)

Ans. $\frac{2}{4}$; $\frac{1}{2}$.

(2)

Ans. $\frac{1}{2}$.

(3)

Ans. $\frac{12}{18}$; $\frac{8}{12}$; $\frac{6}{9}$; $\frac{4}{6}$; $\frac{2}{3}$.

(4)

Ans. $\frac{24}{32}$; $\frac{12}{16}$; $\frac{6}{8}$; $\frac{3}{4}$.

(5)

Ans. $\frac{36}{48}$; $\frac{24}{32}$; $\frac{18}{24}$; $\frac{12}{16}$; $\frac{6}{8}$.

(6)

Ans. $\frac{18}{72}$; $\frac{12}{48}$; $\frac{9}{36}$; $\frac{6}{24}$; $\frac{1}{4}$.

(1) $\frac{7}{49}=\frac{1}{7}$. *Ans.*

(2) $\frac{84}{420}=\frac{1}{5}$. *Ans.*

(3) $\frac{104}{312}=\frac{1}{3}$. *Ans.*

(4) $\frac{1049}{8342}=\frac{1}{8}$. *Ans.*

(5) $\frac{275}{440}=\frac{5}{8}$. *Ans.*

(6) $\frac{351}{795}=\frac{117}{265}$. *Ans.*

(7) $\frac{172}{1118}=\frac{2}{13}$. *Ans.*

(8) $\frac{63}{81}=\frac{7}{9}$. *Ans.*

(9) $\frac{315}{405}=\frac{7}{9}$. *Ans.*

(10) $\frac{1157}{623}=\frac{13}{7}$. *Ans.*

(11) $\frac{792}{1386}=\frac{4}{7}$. *Ans.*

(12) $\frac{374}{1030}=\frac{187}{515}$. *Ans.*

(13) $\frac{410}{510}=\frac{41}{51}$. *Ans.*

(14) $\frac{345}{1745}=\frac{69}{349}$. *Ans.*

(15) $\frac{8343}{9747}=\frac{309}{361}$. *Ans.*

(16) $\frac{549}{7143}=\frac{183}{2381}$. *Ans.*

(17) $\frac{2160}{2340}=\frac{12}{13}$. *Ans.*

(18) $\frac{3152}{1152}=\frac{5}{24}$. *Ans.*

(19) $\frac{10560}{35520}=\frac{11}{37}$ *Ans.*

(20) $\frac{6048}{38592}=\frac{21}{134}$. *Ans.*

(21) $\frac{864}{21600}=\frac{1}{25}$. *Ans.*

(22) $\frac{1080}{66420}=\frac{2}{123}$. *Ans.*

(1) $\frac{108}{63}=1\frac{5}{7}$. *Ans.*

(2) $\frac{576}{48}=12$. *Ans.*

(3) $\frac{1764}{324}=5\frac{4}{9}$. *Ans.*

(4) $\frac{19900}{800}=24\frac{7}{8}$. *Ans.*

(5) $\frac{135}{15}=9lb$. *Ans.*

(6) $\frac{2358}{42}=56\frac{1}{7}$ *da.* *Ans.*

(7) $\frac{6284}{56}=112\frac{3}{14}$ yards. *Ans.*

(8) $\frac{4976}{224}=22\frac{3}{14}$. *Ans.*

(9) $\frac{102409}{160}=640\frac{9}{160}$ acres. *Ans.*

(10) $\frac{4478}{841}=5\frac{273}{841}$. *Ans.*

(11) $\frac{17959}{1256}=14\frac{375}{1256}$. *Ans.*

(12) $\frac{526950}{2342}=225$. *Ans.*

(13) $\frac{4790}{25}=191\frac{3}{5}$. *Ans.*

(14) $\frac{1512}{108}=14$. *Ans.*

(15) $\frac{375941}{999}=376\frac{317}{999}$. *Ans.*

(16) $\frac{3745174}{349}=10731\frac{55}{349}$. *Ans.*

(1) $39\frac{7}{8}=\frac{319}{8}$. *Ans.*

(2) $112\frac{9}{10}=\frac{1129}{10}$. *Ans.*

(3) $427\frac{11}{24}=\frac{10259}{24}$. *Ans.*

(4) $676\frac{37}{51}=\frac{34513}{51}$. *Ans.*

(5) $367\frac{9}{104}=\frac{38177}{104}$. *Ans.*

(6) $847\frac{36}{175}=\frac{148261}{175}$. *Ans.*

(7) $68426\frac{368}{879}=\frac{59267822}{879}$. *Ans.*

(8) $675\frac{187}{200}=\frac{135187}{200}$. *Ans.*

(9) $187\frac{41}{151}=\frac{28278}{151}$. *Ans.*

(10) $149\frac{5}{9}=\frac{1346}{9}$. *Ans.*

(11) $375\frac{94}{99}=\frac{37219}{99}$. *Ans.*

(12) $17494\frac{543}{999999}=\frac{17493883049}{999999}$. *Ans.*

(13) $4834\frac{57}{95}=\frac{459287}{95}$. *Ans.*

(14) $1789\frac{5}{9}=\frac{16106}{9}$. *Ans.*

(15) $125\frac{6}{7}=\frac{881}{7}$ *Ans.*

(16) $375\frac{3}{4}=\frac{1503}{4}$. *Ans.*

(17) $464\frac{19}{63}=\frac{29251}{63}$. *Ans.*

(18) $96\frac{11}{640}=\frac{61451}{640}$. *Ans.*

(19) $984\frac{41}{112}=\frac{110249}{112}$. *Ans.*

(20) $35\frac{72}{366}=\frac{12882}{366}$. *Ans.*

(21) $87\frac{41}{135}=\frac{11785}{135}$. *Ans.*

(22) $777=78$. *Ans.*

(23) $333\frac{3}{3}=334$. *Ans.*

(1) $18=\frac{126}{7}$. *Ans.*

(2) $25=\frac{300}{12}$. *Ans.*

(3) $19=\frac{152}{8}$. *Ans.*

(4) $29=\frac{406}{14}$. *Ans.*

(5) $65=\frac{2405}{37}$. *Ans.*

(6) $145=\frac{1305}{9}$. *Ans.*

(7) $450=\frac{5400}{12}$. *Ans.*

(8) $327=\frac{11772}{36}$. *Ans.*

(9) $97=\frac{12416}{128}$. *Ans.*

(10) $167=\frac{14863}{89}$. *Ans.*

(11) $325=\frac{24375}{75}$. *Ans.*

(1) $\frac{\cancel{3}}{\cancel{4}_{2}}$ of $\frac{5}{2}$ of $\frac{\cancel{2}}{3}=\frac{5}{12}$. *Ans.*

(2) $\frac{\cancel{2}}{5}$ of $\frac{7}{\cancel{9}_{3}}$ of $\frac{\cancel{3}}{\cancel{4}_{2}}=\frac{7}{30}$. *Ans.*

(3) $\frac{\cancel{2}}{\cancel{3}}$ of $\frac{\cancel{3}}{7}$ of $\frac{9}{\cancel{4}_{2}}=\frac{9}{14}$. *Ans.*

(4)

9	2
2 5	3
6	5
3	10 5
18	$5=\frac{5}{18}$. *A.*

(5)

2 10	9 3
	3 2
	8 7
	14 5
16	$3=\frac{3}{16}$. *A.*

(6)

4	1
2	1
4	3
2	25
64	$75=\frac{75}{64}$. *A.*

(7)

7	2
6	5
5	21
1	$1=1$. *A.*

(8)

2 10	9
2 12	3 11 22 13
	65
4	$143=\frac{143}{4}=35\frac{3}{4}$.

(9)

4 9	7
3	28 7
7	45 3
5	14 7
1	$147=147$. *A.*

(10)

6 14 12	9
9	7 7
	196
6	$49=\frac{49}{6}=8\frac{1}{6}$. *Ans.*

(11)

2 4 6	3 5
9	5
4 100	27
13	5
416	$15=\frac{15}{416}$. Ans.

(12)

$$\begin{array}{r|l} 110 & 41 \\ \cancel{19} & \cancel{3}\ \cancel{3} \\ 4\ \cancel{108} & \cancel{57} \\ 7 & \cancel{3} \\ \hline 3080 & 41 = \frac{41}{3080}. \end{array} \quad \textit{Ans.}$$

(13)

$$\begin{array}{r|l} \cancel{8} & 29 \\ \cancel{7} & 5\ 4 \\ 43\ \cancel{301} & \cancel{32} \\ 1 & \cancel{49} \\ \hline 43 & 580 = \frac{580}{43} = 13\frac{21}{43}. \end{array}$$

(1)

$\frac{3}{4}, \frac{16}{3}, \frac{6}{7} = \frac{63}{84}, \frac{348}{84}, \frac{72}{84}.$ *Ans.*

(2)

$\frac{3}{5}, \frac{2}{3}, \frac{1}{7}, \frac{5}{2} = \frac{126}{210}, \frac{140}{210}, \frac{30}{210}, \frac{525}{210}.$ *Ans.*

(3)

$\frac{19}{2}, \frac{13}{3}, \frac{11}{4}, \frac{4}{5} = \frac{570}{60}, \frac{260}{60}, \frac{165}{60}, \frac{48}{60}.$ *Ans.*

(4)

$\frac{2}{3}, \frac{7}{8}, \frac{5}{6}, \frac{1}{2}, \frac{9}{4} = \frac{16}{24}, \frac{21}{24}, \frac{20}{24}, \frac{12}{24}, \frac{54}{24}.$ *Ans.*

(5)

$\frac{15}{2}, \frac{6}{7}, \frac{4}{9}, \frac{3}{5} = \frac{4725}{630}, \frac{540}{630}, \frac{280}{630}, \frac{378}{630}.$ *Ans.*

(6)

$2\frac{1}{2}$ of $3\frac{1}{7}$ of $\frac{2}{3} = \frac{110}{21}$; $6\frac{1}{3}$ of $\frac{3}{2} = \frac{19}{2}, \frac{110}{21}, \frac{19}{2} = \frac{220}{42}, \frac{399}{42}.$ *Ans.*

(7)

$\frac{3}{7}$ of $\frac{2}{3}$ of $\frac{5}{8} = \frac{5}{28}$; $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{3}{5} = \frac{9}{28}, \frac{5}{28}, \frac{9}{28}.$ *Ans.*

(8)

$\frac{44}{9}, \frac{7}{3}, \frac{11}{2}, \frac{6}{1} = \frac{88}{18}, \frac{42}{18}, \frac{99}{18}, \frac{108}{18}.$ *Ans.*

(9)

$\frac{26}{5}, \frac{6}{5}, \frac{7}{2}, \frac{11}{3} = \frac{156}{30}, \frac{36}{30}, \frac{105}{30}, \frac{110}{30}.$ *Ans.*

(10)

$\frac{3}{4}$ of $5\frac{1}{3} = \frac{16}{4}$; $\frac{1}{2}$ of $3\frac{1}{7} = \frac{22}{14}$; $\frac{7}{12}$ of $8\frac{1}{2} = \frac{119}{24}$; $\frac{16}{4}, \frac{22}{14}, \frac{119}{24},$
$= \frac{672}{168}, \frac{264}{168}, \frac{833}{168}.$ *Ans.*

(11)

$6\frac{1}{3}$ of $2 = \frac{38}{3}$; $\frac{38}{3}, \frac{3}{7}, \frac{43}{7}, \frac{1}{3} = \frac{266}{21}, \frac{9}{21}, \frac{129}{21}, \frac{7}{21}.$ *Ans.*

(1)

$\frac{3}{4}, \frac{7}{12}, \frac{1}{2}, \frac{5}{6} = \frac{9}{12}, \frac{7}{12}, \frac{6}{12}, \frac{10}{12}.$ *Ans.*

(2)

$\frac{6}{7}, \frac{8}{21}, \frac{2}{3} = \frac{18}{21}, \frac{8}{21}, \frac{14}{21}$. *Ans.*

(3)

$\frac{21}{5}, \frac{9}{10}, \frac{29}{4} = \frac{84}{20}, \frac{18}{20}, \frac{145}{20}$. *Ans.*

(4)

$\frac{95}{9}, \frac{5}{6}, \frac{22}{3} = \frac{190}{18}, \frac{15}{18}, \frac{132}{18}$. *Ans.*

(5)

$\frac{31}{5}, \frac{5}{6}, \frac{22}{3} = \frac{186}{30}, \frac{25}{30}, \frac{220}{30}$. *Ans.*

(6)

$\frac{4}{5}, \frac{7}{8}, \frac{29}{2}, \frac{15}{4} = \frac{32}{40}, \frac{35}{40}, \frac{580}{40}, \frac{150}{40}$. *Ans.*

(7)

$\frac{7}{12}, \frac{8}{9}, \frac{17}{6}, \frac{11}{8} = \frac{42}{72}, \frac{64}{72}, \frac{204}{72}, \frac{99}{72}$. *Ans.*

(8)

$\frac{6}{7}, \frac{1}{6}, \frac{16}{21}, \frac{2}{3} = \frac{36}{42}, \frac{7}{42}, \frac{32}{42}, \frac{28}{42}$. *Ans.*

(9)

$\frac{9}{11}, \frac{3}{4}, \frac{19}{22}, \frac{1}{2} = \frac{36}{44}, \frac{33}{44}, \frac{38}{44}, \frac{22}{44}$. *Ans.*

(10)

$\frac{5}{2}, \frac{31}{6}, \frac{9}{10}, \frac{53}{12} = \frac{150}{60}, \frac{310}{60}, \frac{54}{60}, \frac{265}{60}$. *Ans.*

(1)

$2)\frac{3}{8}, \frac{4}{7}, \frac{5}{12} = \frac{63}{168}, \frac{96}{168}, \frac{70}{168}$.

$2)4 \quad 7 \quad 6$

$2 \quad 7 \quad 3$

$2 \times 2 \times 2 \times 7 \times 3 = 168$.

(2)

$7)\frac{5}{14}, \frac{3}{7}, \frac{16}{21} = \frac{15}{42}, \frac{18}{42}, \frac{32}{42}$.

$2 \quad 1 \quad 3$

$7 \times 2 \times 3 = 42$.

(3)

$2)\frac{11}{4}, \frac{5}{16}, \frac{9}{32} = \frac{88}{32}, \frac{10}{32}, \frac{9}{32}$.

$2)2 \quad 8 \quad 16$

$2)1 \quad 4 \quad 8$

$2)1 \quad 2 \quad 4$

$1 \quad 1 \quad 2$

$2 \times 2 \times 2 \times 2 \times 2 = 32$.

(4)

$3)\frac{43}{8}, \frac{53}{12}, \frac{7}{24} = \frac{129}{24}, \frac{106}{24}, \frac{7}{24}$.

$2) 8 \quad 4 \quad 8$

$2) 4 \quad 2 \quad 4$

$2) 2 \quad 1 \quad 2$

$1 \quad 1 \quad 1$

$3 \times 2 \times 2 \times 2 = 24$.

(5)

$5)\frac{127}{15}, \frac{2}{5}, \frac{7}{30} = \frac{254}{30}, \frac{12}{30}, \frac{7}{30}.$

3) 3 1 6

1 1 2

$5 \times 3 \times 2 = 30.$

(6)

$11)\frac{107}{11}, \frac{3}{22}, \frac{5}{33} = \frac{642}{66}, \frac{9}{66}, \frac{10}{66}.$

1 2 3

$11 \times 2 \times 3 = 66.$

(7)

$7)\frac{5}{2}, \frac{68}{21}, \frac{1}{14} = \frac{105}{42}, \frac{136}{42}, \frac{3}{42}.$

2)2 3 2

1 3 1

$7 \times 2 \times 3 = 42.$

(8)

$2)\frac{41}{12}, \frac{7}{6}, \frac{3}{8}, \frac{9}{16} = \frac{164}{48}, \frac{56}{48}, \frac{18}{48}, \frac{27}{48}.$

2) 6 3 4 8

3) 3 3 2 4

2) 1 1 2 4

1 1 1 2

$2 \times 2 \times 3 \times 2 \times 2 = 48.$

(9)

$3)\frac{8}{9}, \frac{5}{27}, \frac{7}{36} = \frac{96}{108}, \frac{20}{108}, \frac{21}{108}.$

3)3 9 12

1 3 4

$3 \times 3 \times 3 \times 4 = 108.$

(10)

$13)\frac{58}{13}, \frac{185}{26}, \frac{5}{39} = \frac{348}{78}, \frac{555}{78}, \frac{10}{78}.$

1 2 3

$13 \times 2 \times 3 = 78.$

(11)

$3)\frac{31}{9}, \frac{113}{18}, \frac{37}{36} = \frac{124}{36}, \frac{226}{36}, \frac{37}{36}.$

3) 3 6 12

2) 1 2 4

1 1 2

$3 \times 3 \times 2 \times 2 = 36.$

(12)

$5)\frac{32}{5}, \frac{87}{10}, \frac{49}{20} = \frac{128}{20}, \frac{174}{20}, \frac{49}{20}.$

2) 1 2 4

1 1 2

$5 \times 2 \times 2 = 20.$

(13)

$11)\frac{59}{11}, \frac{135}{22}, \frac{9}{33} = \frac{354}{66}, \frac{405}{66}, \frac{4}{66}.$

1 2 3

$11 \times 2 \times 3 = 66.$

(14)

$17)\frac{9}{17}, \frac{71}{34}, \frac{73}{68} = \frac{36}{68}, \frac{142}{68}, \frac{73}{68}.$

2) 1 2 4

1 1 2

$17 \times 2 \times 2 = 68.$

(15)

$3)\frac{52}{9}, \frac{113}{18}, \frac{7}{36}, \frac{1}{72} = \frac{416}{72}, \frac{452}{72}, \frac{14}{72}, \frac{1}{72}.$

3) 3 6 12 24

2) 1 2 4 8

2) 1 1 2 4

1 1 1 2

$3 \times 3 \times 2 \times 2 \times 2 = 72.$

ADDITION OF COMMON FRACTIONS.

(1)
$\frac{3}{5}+\frac{9}{5}+\frac{8}{5}+\frac{7}{5}=5\frac{2}{5}$. *Ans.*

(2)
$\frac{5}{9}+\frac{7}{9}+\frac{3}{9}+\frac{11}{9}=2\frac{8}{9}$. *Ans.*

(3)
$\frac{1}{11}+\frac{6}{11}+\frac{14}{11}+\frac{8}{11}=2\frac{7}{11}$. *Ans.*

(4)
$\frac{19}{15}+\frac{17}{15}+\frac{18}{15}+\frac{7}{15}=4\frac{1}{15}$. *A.*

(5)
$\frac{3}{7}+\frac{9}{7}+\frac{5}{7}+\frac{19}{7}+\frac{11}{7}=6\frac{5}{7}$. *A.*

(6)
$\frac{5}{12}+\frac{4}{12}+\frac{3}{12}+\frac{1}{12}+\frac{20}{12}=2\frac{3}{4}$. *A.*

(7)
$\frac{1}{4}+\frac{2}{5}+\frac{9}{10}=1\frac{11}{20}$. *Ans.*

(8)
$\frac{2}{3}+\frac{4}{5}+\frac{5}{6}+\frac{7}{15}=2\frac{23}{30}$. *Ans.*

(9)
$\frac{3}{4}+\frac{2}{7}+\frac{5}{8}+\frac{9}{14}=2\frac{17}{56}$. *Ans.*

(10)
$\frac{5}{9}+\frac{7}{12}+\frac{5}{18}+\frac{21}{17}=2\frac{1133}{2044}$. *Ans.*

(11)
$\frac{7}{8}+\frac{7}{12}+\frac{13}{16}+\frac{11}{18}+\frac{19}{24}=3\frac{97}{144}$. *A.*

(12)
$\frac{3}{4}+\frac{5}{8}+\frac{9}{16}+\frac{5}{32}+\frac{15}{64}=2\frac{21}{64}$.

(13)
$\frac{1}{16}+\frac{3}{7}+\frac{2}{8}+\frac{4}{9}=1\frac{1887}{10088}$. *Ans.*

(14)
$\frac{1}{5}+\frac{13}{3}+\frac{2}{5}=4\frac{14}{15}$. *Ans.*

(15)
$\frac{3}{11}+\frac{5}{12}+\frac{13}{4}+\frac{2}{3}=4\frac{220}{333}$. *Ans.*

(16)
$\frac{9}{17}+\frac{5}{12}+\frac{2}{5}+\frac{7}{8}=2\frac{4851}{20440}$. *Ans.*

(18)
$\frac{1}{2}+\frac{1}{3}=\frac{6}{6}$; $\frac{1}{2}+\frac{1}{5}=\frac{7}{10}$; $\frac{1}{7}+\frac{1}{9}=\frac{16}{63}$; $\frac{1}{9}+\frac{1}{10}=\frac{19}{90}$. *Ans.*

(19)
$\frac{1}{12}+\frac{1}{10}=\frac{22}{120}$; $\frac{1}{15}+\frac{1}{16}=\frac{31}{240}$; $\frac{1}{6}+\frac{1}{9}=\frac{15}{54}$; $\frac{1}{8}+\frac{1}{5}=\frac{13}{40}$. *Ans*

(20)
$\frac{63}{5}+\frac{35}{3}+\frac{11}{7}\frac{0}{0}=39\frac{1035}{1055}$. *Ans.*

(21)

$1\frac{2}{4}+3\frac{1}{7}+\frac{7}{2}=9\frac{25}{28}$. *Ans.*

(22)

$3\frac{33}{35}+7\frac{4}{5}+\frac{17}{24}+2\frac{11}{15}=15\frac{337}{600}$. *Ans.*

(23)

$2\frac{3}{5}+4\frac{7}{8}+\frac{159}{40}=11\frac{9}{20}$. *Ans.*

(24)

$12\frac{3}{4}+9\frac{2}{3}+\frac{26}{7}=26\frac{11}{84}$. *Ans.*

(25)

$\frac{9}{10}$ of $6\frac{7}{8}+\frac{4}{7}$ of $7\frac{1}{2}=\frac{99}{16}+\frac{30}{7}=10\frac{533}{112}$. *Ans.*

(26)

$\frac{1}{6}$ of $9\frac{3}{8}+\frac{2}{3}$ of $4\frac{5}{8}=\frac{75}{40}+\frac{74}{24}=4\frac{23}{24}$. *Ans.*

(27)

$\frac{3}{5}+\frac{36}{11}+\frac{5}{2}=6\frac{41}{110}$. *Ans.*

(28)

$\frac{35}{8}+\frac{93}{44}=6\frac{43}{88}$. *Ans.*

(29)

$3\frac{5}{7}+4\frac{5}{8}+16\frac{5}{11}=24\frac{489}{616}$. *Ans.*

(30)

$3\frac{5}{7}+4\frac{5}{8}+5\frac{1}{3}=13\frac{113}{168}$. *Ans.*

(31)

$6\frac{3}{4}+13\frac{3}{7}+18\frac{1}{8}+132\frac{1}{6}=170\frac{79}{168}$. *Ans.*

(32)

$12\frac{5}{7}+26\frac{8}{9}+40\frac{13}{18}=80\frac{41}{126}$. *Ans.*

(33)

$\$2\frac{5}{8}+\$9\frac{5}{6}+\$5\frac{3}{4}=\$18\frac{5}{24}$. *Ans.*

(34)

$35\frac{1}{3}+28\frac{4}{7}+25\frac{7}{21}=89\frac{5}{21}$ miles. *Ans.*

(35)

$54\frac{3}{4}+55\frac{3}{8}+51\frac{7}{16}+50\frac{21}{32}=212\frac{7}{32}$ pounds. *Ans.*

(36)

$\frac{7}{12}+3\frac{4}{9}+7\frac{3}{4}+5\frac{1}{6}=\$16\frac{17}{18}$. *Ans.*

(37)

$22\frac{5}{6}+20\frac{7}{8}+21\frac{4}{5}=65_{1}\frac{61}{20}$ pounds. *Ans.*

(38)

$18\frac{7}{12}+19\frac{11}{20}+19\frac{5}{9}+21\frac{1}{15}+20\frac{13}{18}=100\frac{13}{90}cwt.$ *Ans.*

(39)

$17\frac{3}{5}+25\frac{2}{9}+46\frac{8}{15}=89\frac{16}{45}$ acres. *Ans.*

(40)

$112\frac{6}{7}+9\frac{5}{12}+225\frac{9}{14}=347\frac{11}{12}$ bushels. *Ans.*

$\$250\frac{4}{5}+\$62\frac{3}{8}+\$104\frac{7}{9}=\$417\frac{313}{360}$ *Ans.*

ADDITION OF FRACTIONS.

(1)

$\frac{3}{8}yd.\times 3ft.\times 12in.=\frac{27}{2}in.=13\frac{1}{2}in.$; $13\frac{1}{2}in+\frac{5}{9}in.=14\frac{1}{18}in.$

(2)

$\frac{1}{3}wk.\times 7da.\times 24hr.=\frac{168}{3}hr.$; $\frac{1}{4}da.\times 24hr.=\frac{24}{4}hr.$;
$\frac{168}{3}hr.+\frac{24}{4}hr.+\frac{1}{2}hr.=\frac{750}{24}hr.=1da.\ 14\frac{1}{2}hr.$ *Ans.*

(3)

$\frac{3}{4}cwt.=3qr.$; $\frac{42}{2}lb.=21lb.$; $\frac{1}{2}cwt.=2qr.$; $3qr.+2qr.+21lb.+$
$6lb.+13oz.=1cwt.\ 2qr.\ 2lb.\ 13oz.$ *Ans.*

(4)

$\frac{1}{8}lb.\ Troy=2oz.\ 8pwt.$; $\frac{1}{8}oz.=2pwt.\ 12gr.$; $2oz.\ 8pwt.+2pwt.$
$12gr.=2oz.\ 10pwt.\ 12gr.$ *Ans.*

(5)

$\frac{4}{9}$ of a ton.$=8cwt.\ 3qr.\ 13lb.\ 14\frac{2}{9}oz.$;
$1\frac{5}{12}$ of a $cwt.=$ $\quad 1qr.\ 16lb.\ 10\frac{2}{3}oz.$
$9cwt.\ 1qr.\ 5lb.\ 8\frac{8}{9}$oz. Ans.

(6)

$\frac{5}{6}$ of a *chal.* = 20 bushels :
$\frac{3}{7}$ of a *bush.* = 1 *b.* $5\frac{5}{7}$*pt.*
2*chal.* 1*b.* $5\frac{5}{7}$*pt.* *Ans.*

(7)

$\frac{3}{4}$ of a tun = 3*hhd.*
$\frac{3}{5}$ of a *hhd.* = 37*gal.* 1*qt.* $1\frac{1}{5}$*pt.*
3*hhd.* 37*gal.* 1*qt.* $1\frac{1}{5}$*pt.* *Ans.*

(8)

$\frac{1}{5}$ of $\frac{3}{4}$ of a year = 1*mo.* 3*wk.* 1*da.* 9*hr.* 36*m.*
$\frac{2}{3}$ of $\frac{5}{9}$ of a day = 5*hr.*
$\frac{7}{9}$ of $\frac{2}{3}$ of $\frac{3}{8}$ of $19\frac{1}{2}$*hr.* = 3*hr.* 47*m.* 30*sec.*
1*mo.* 3*wk.* 1*da.* 18*hr.* 23*m.* 30*sec.* *A.*

(9)

$\frac{5}{8}$ of an acre = 2*R.* 20*P.*
$\frac{3}{5}$ of 19*sq. ft.* = 11*sq. ft.* $57\frac{3}{5}$*sq. in.*
$\frac{3}{7}$ of a *sq. in.* = $\frac{3}{7}$*sq. in.*
2*R.* 20*P.* 11*sq. ft.* $58\frac{1}{35}$*sq. in.* *Ans.*

(10)

$\frac{1}{7}$ of a yard = $5\frac{1}{7}$*in.*
$\frac{1}{7}$ of a foot = $1\frac{5}{7}$*in.*
$\frac{1}{7}$ of an inch = $\frac{1}{7}$*in.*
7 inches. *A.*

(11)

$\frac{2}{3}$ of a £ = 13*s.* 4 *d.*
$\frac{5}{9}$ of a shillng = $6\frac{2}{3}$*d.*
13*s.* $10\frac{2}{3}$*d.* *A.*

(12)

$\frac{1}{4}$ of a week = 1*da.* 18*hr.*
$\frac{1}{3}$ of a day = 8*hr.*
$\frac{1}{2}$ of an hour = 30*m.*
$\frac{3}{4}$ of a minute = 45*sec.*
2*da.* 2*hr.* 30*m.* 45*sec.* *Ans.*

(13)

$\frac{7}{8}$ of a mile $= 7\ fur.$
$\frac{2}{3}$ of a yard $= 2ft.$
$\frac{3}{4}$ of a foot $= 9in.$
$7fur.\ 2ft.\ 9in.$ *Ans.*

(14)

$\frac{3}{5}$ of a year $= 7mo.\ 0wk.\ 5da.\ 14hr.\ 24m.$
$\frac{1}{3}$ of a week $= 2da.\ 8hr.$
$\frac{1}{8}$ of a day $= 3hr.$
$7mo.\ 1wk.\ 1da.\ 1hr.\ 24m.$ *Ans.*

(15)

$\frac{4}{7}$ of a ton $= 11cwt.\ 1qr.\ 17lb.\ 13oz.\ 11\frac{3}{7}dr.$
$\frac{5}{6}$ of a $cwt. = 3qr.\ 8lb.\ 5oz.$
$12cwt.\ 1qr.\ 1lb.\ 2oz.\ 11\frac{3}{7}dr.$ *Ans.*

(16)

$\frac{3}{5}$ of a pound Troy $= 7oz.\ 4pwt.$
$\frac{1}{6}$ of an ounce $= 3pwt.\ 8gr.$
$\frac{5}{8}$ of a pennyweight $= 15gr.$
$7oz.\ 7pwt.\ 23gr.$ *Ans.*

(17)

$\frac{3}{19}$ of a Circle $= 1$ sign $26°\ 50'\ 31\frac{11}{19}''$
$3\frac{5}{8}$ signs $= 3$ signs $18°\ 45'$
$\frac{2}{3}$ of a degree $= 40'$
$\frac{2}{9}$ of $5\frac{1}{7}$ minutes $= 1'\ 8\frac{4}{7}''$
5 signs $16°\ 16'\ 40\frac{20}{133}''$ *Ans.*

(18)

$\frac{7}{8}$ of a yard $= 3qr.\ 2\ na.$
$\frac{3}{5}$ of $\frac{5}{8}$ of a quarter $= 1\frac{1}{2}na.$
$3\frac{1}{3}$ nails $= 3\frac{1}{3}na.$
$1yd.\ 0qr.\ 2\frac{5}{6}na.$ *Ans.*

(19)

$\frac{3}{16}$ of a cord $=1$ *cord ft.* 8 *cubic ft.*
$\frac{5}{9}$ of a *cu.* foot $=$ 960 *c. in.*
$\frac{2}{5}$ of $\frac{1}{2}$ of $24\frac{3}{7}$ c. feet $=$ 2 *cubic ft.* $987\frac{3}{7}$ *c. in.*
1 *cord ft.* 11 *cubic ft.* $219\frac{3}{7}$ *c. in.* *A.*

(20)

$\frac{3}{4}$ of $\frac{1}{3}$ of 4 cords $=1$ cord 4 cord ft.
$\frac{5}{6}$ of $\frac{9}{16}$ of 15 cord ft. $=$ 7 cord ft. 00 *c. ft.* 864 *c. in.*
$\frac{5}{9}$ of $31\frac{1}{2}$ *c. ft.* $=$ 7 *c. ft.* 864 *c. in.*
2 cords 3 cord ft. 8 *c. ft.* *Ans.*

(21)

$\frac{5}{6}$ of 3 *E. E.* $=3yd.$ $0qr.$ 2 *na.*
$\frac{5}{12}$ of a yard $=$ $1qr.$ $2\frac{2}{3}na.$
$3yd.$ $2qr.$ $0\frac{2}{3}na.$ *Ans.*

(22)

$\frac{4}{5}$ of 3*A.* 1*R.* 20*P.* $=2A.$ $2R.$ 30 *P.*
$\frac{3}{8}$ of an acre $=$ $1R.$ 20 *P.*
$\frac{3}{4}$ of 3*R.* 15*P.* $=$ $2R.$ $21\frac{1}{4}P.$
3*A.* 2*R.* $31\frac{1}{4}P.$ *Ans.*

(23)

$\frac{7}{12}$ of a ton $=11cwt.$ $2qr.$ $16lb.$ $10oz.$ $10\frac{2}{3}dr.$
$\frac{3}{10}$ of a *cwt.* $=$ $1qr.$ $2lb.$
$\frac{5}{12}$ of an ounce $=$ $6\frac{2}{3}dr.$
$11cwt.$ $3qr.$ $18lb.$ $11oz.$ $1\frac{1}{3}dr.$ *Ans.*

(24)

$\frac{1}{2}$ of $\frac{3}{5}$ of a mile $=2fur.$ $16rd.$
$\frac{3}{5}$ of a furlong $=$ $24rd.$
$\frac{4}{33}$ of a rod $=$ $2ft.$
$\frac{1}{2}$ of a foot $=$ $6in.$
$3fur.$ $00rd.$ $2ft.$ $6in.$ *Ans.*

(25)

$\frac{1}{25}$ of a year = 1*wk.* 6*da.* 10*hr.* 33*m.* 36*sec.*
$\frac{5}{12}$ of a week = 2*da.* 22*hr.*
$\frac{7}{9}$ of a day = 18*hr.* 40*m.*
$\frac{3}{4}$ of an hour = 45*m.*

2*wk.* 3*da.* 3*hr.* 58*m.* 36*sec.* *Ans.*

SUBTRACTION OF FRACTIONS.

(1) $\frac{3}{7}-\frac{1}{7}=\frac{2}{7}$. *Ans.*

(2) $\frac{14}{19}-\frac{11}{19}=\frac{3}{19}$. *Ans.*

(3) $\frac{16}{25}-\frac{12}{25}=\frac{4}{25}$. *Ans.*

(4) $\frac{204}{305}-\frac{104}{305}=\frac{100}{305}$. *Ans.*

(5) $\frac{6}{7}-\frac{4}{5}=\frac{2}{35}$. *Ans.*

(6) $\frac{11}{12}-\frac{13}{16}=\frac{5}{48}$. *Ans.*

(7) $\frac{14}{15}-\frac{12}{13}=\frac{2}{195}$. *Ans.*

(8) $37\frac{11}{15}-\frac{1}{3}$ of $5\frac{5}{6}=\frac{566}{15}-\frac{35}{18}=\frac{3221}{90}=35\frac{71}{90}$. *Ans.*

(9) $\frac{3}{4}-\frac{5}{9}=\frac{7}{36}$. *Ans.*

(10) $\frac{7}{8}-\frac{5}{18}=\frac{43}{72}$. *Ans.*

(11) $25-\frac{11}{15}=24\frac{4}{15}$. *A.*

(12) $\frac{6}{15}$ of $3-\frac{1}{3}$ of $\frac{4}{9}=\frac{6}{5}-\frac{4}{27}=\frac{162}{135}=1\frac{27}{135}$. *A.*

(13) $\frac{1}{7}$ of $\frac{3}{6}$ of $7=\frac{1}{2}$; $\frac{1}{2}-\frac{3}{8}=\frac{1}{8}$. *Ans.*

(14) $3\frac{5}{8}-\frac{2}{3}$ of $\frac{7}{8}=\frac{29}{8}-\frac{14}{24}=3\frac{1}{24}$. *Ans.*

(15) $\frac{2}{3}$ of $15-\frac{4}{5}$ of $3=\frac{10}{\frac{1}{4}}-\frac{12}{5}=73\frac{3}{5}$. *Ans.*

(12)

$$\begin{array}{r|l} 110 & 41 \\ \cancel{19} & \cancel{3}\ \cancel{3} \\ 4\ \cancel{108} & \cancel{57} \\ 7 & \cancel{3} \\ \hline 3080 & 41 = \frac{41}{3080}. \end{array} \quad \textit{Ans.}$$

(13)

$$\begin{array}{r|l} \cancel{8} & 29 \\ \cancel{7} & 5 \\ 43\ \cancel{301} & \cancel{32}\ 4 \\ 1 & \cancel{49} \\ \hline 43 & 580 = \frac{580}{43} = 13\frac{21}{43}. \end{array}$$

(1)

$\frac{3}{4}, \frac{16}{3}, \frac{6}{7} = \frac{63}{84}, \frac{348}{84}, \frac{72}{84}.$ *Ans.*

(2)

$\frac{3}{5}, \frac{2}{3}, \frac{1}{7}, \frac{5}{2} = \frac{126}{210}, \frac{140}{210}, \frac{30}{210}, \frac{525}{210}.$ *Ans.*

(3)

$\frac{19}{2}, \frac{13}{3}, \frac{11}{4}, \frac{4}{5} = \frac{570}{60}, \frac{260}{60}, \frac{165}{60}, \frac{48}{60}.$ *Ans.*

(4)

$\frac{2}{3}, \frac{7}{8}, \frac{5}{6}, \frac{1}{2}, \frac{9}{4} = \frac{16}{24}, \frac{21}{24}, \frac{20}{24}, \frac{12}{24}, \frac{54}{24}.$ *Ans.*

(5)

$\frac{15}{2}, \frac{6}{7}, \frac{4}{9}, \frac{3}{5} = \frac{4725}{630}, \frac{540}{630}, \frac{280}{630}, \frac{378}{630}.$ *Ans.*

(6)

$2\frac{1}{2}$ of $3\frac{1}{7}$ of $\frac{2}{3} = \frac{110}{21}$; $6\frac{1}{3}$ of $\frac{3}{2} = \frac{19}{2}, \frac{110}{21}, \frac{19}{2} = \frac{220}{42}, \frac{399}{42}.$ *Ans.*

(7)

$\frac{3}{7}$ of $\frac{2}{3}$ of $\frac{5}{8} = \frac{5}{28}$; $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{3}{5} = \frac{9}{28}, \frac{5}{28}, \frac{9}{28}.$ *Ans.*

(8)

$\frac{44}{9}, \frac{7}{3}, \frac{11}{2}, \frac{6}{1} = \frac{88}{18}, \frac{42}{18}, \frac{99}{18}, \frac{108}{18}.$ *Ans.*

(9)

$\frac{26}{5}, \frac{6}{5}, \frac{7}{2}, \frac{11}{3} = \frac{156}{30}, \frac{36}{30}, \frac{105}{30}, \frac{110}{30}.$ *Ans.*

(10)

$\frac{3}{4}$ of $5\frac{1}{3} = \frac{16}{4}$; $\frac{1}{2}$ of $3\frac{1}{7} = \frac{22}{14}$; $\frac{7}{12}$ of $8\frac{1}{2} = \frac{119}{24}$; $\frac{16}{4}, \frac{22}{14}, \frac{119}{24},$
$= \frac{672}{168}, \frac{264}{168}, \frac{833}{168}.$ *Ans.*

(11)

$6\frac{1}{3}$ of $2 = \frac{38}{3}$; $\frac{38}{3}, \frac{3}{7}, \frac{43}{7}, \frac{1}{3} = \frac{266}{21}, \frac{9}{21}, \frac{129}{21}, \frac{7}{21}.$ *Ans.*

(1)

$\frac{3}{4}, \frac{7}{12}, \frac{1}{2}, \frac{5}{6} = \frac{9}{12}, \frac{7}{12}, \frac{6}{12}, \frac{10}{12}.$ *Ans.*

(30)

$27\frac{4}{9}+32\frac{1}{6}=59\frac{11}{18}$; $59\frac{11}{18}-40\frac{7}{18}=18\frac{2}{3}$ yards. *Ans.*

(1)

$14\frac{4}{7}-12\frac{6}{19}=2\frac{34}{133}$. *Ans.*

(2)

$115\frac{8}{8}-39\frac{7}{8}=76\frac{1}{8}$. *Ans.*

(3)

$78\frac{3}{16}-4\frac{7}{32}=73\frac{31}{32}$. *Ans.*

(4)

$48\frac{5}{19}-41\frac{15}{38}=6\frac{33}{38}$. *Ans.*

(5)

$287\frac{5}{25}-104\frac{37}{100}=182\frac{83}{100}$. *Ans.*

(1)

$\frac{5}{6}$ of a pound $=10oz.\ 00pwt.\ 00gr.$
$\frac{5}{8}$ of an ounce$=\quad 12pwt.\ 12gr.$
$9oz.\ 7pwt.\ 12gr.$ *Ans.*

(2)

$\frac{3}{8}$ of a ton $=7cwt.\ 2qr.\ 00lb.\ 0oz.$
$\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}lb.=\quad 8oz.$
$7cwt.\ 1qr.\ 24lb.\ 8oz.$ *Ans.*

(3)

$\frac{2}{3}$ of $\frac{5}{7}$ of a $hhd.=\frac{10}{21}hhd.=30gal.$
$\frac{3}{4}$ of $\frac{1}{2}$ of a $qt.\ =\quad \frac{3}{8}qt.$
$29gal.\ 3\frac{5}{8}qt.$ *Ans.*

(4)

$\frac{3}{5}$ of a $L.\ =1m.\ 6fur.\ 16rd.$
$\frac{5}{8}$ of a mile$=\quad 5fur.$
$1m.\ 1fur.\ 16rd.$ *Ans.*

(5)

$1\frac{2}{3}$ shillings $=1s.\ 8d.$
$\frac{2}{3}$ of $7\frac{1}{2}d.\ =\quad 5d.$
$1s.\ 3d.$ *Ans.*

(6)

$\frac{21}{28}$ of a degree $=45'$
$\frac{3}{4}$ of $\frac{1}{7}$ of a deg.$=\ 6'\ 25\frac{5}{7}''$
$38'\ 34\frac{2}{7}''$ A.

(5)

$5)\frac{127}{15}, \frac{2}{5}, \frac{7}{30} = \frac{254}{30}, \frac{12}{30}, \frac{7}{30}.$

$3)\ 3\quad 1\quad 6$

$1\quad 1\quad 2$

$5\times3\times2=30.$

(6)

$11)\frac{107}{11}, \frac{3}{22}, \frac{5}{33} = \frac{642}{66}, \frac{9}{66}, \frac{10}{66}.$

$1\quad 2\quad 3$

$11\times2\times3=66.$

(7)

$7)\frac{5}{2}, \frac{68}{21}, \frac{1}{14} = \frac{105}{42}, \frac{136}{42}, \frac{3}{42}.$

$2)2\quad 3\quad 2$

$1\quad 3\quad 1$

$7\times2\times3=42.$

(8)

$2)\frac{41}{12}, \frac{7}{6}, \frac{3}{8}, \frac{9}{16} = \frac{164}{48}, \frac{56}{48}, \frac{18}{48}, \frac{27}{48}.$

$2)6\quad 3\quad 4\quad 8$

$3)3\quad 3\quad 2\quad 4$

$2)1\quad 1\quad 2\quad 4$

$1\quad 1\quad 1\quad 2$

$2\times2\times3\times2\times2=48.$

(9)

$3)\frac{8}{9}, \frac{5}{27}, \frac{7}{36} = \frac{96}{108}, \frac{20}{108}, \frac{21}{108}.$

$3)3\quad 9\quad 12$

$1\quad 3\quad 4$

$3\times3\times3\times4=108.$

(10)

$13)\frac{58}{13}, \frac{185}{26}, \frac{5}{39} = \frac{348}{78}, \frac{555}{78}, \frac{10}{78}.$

$1\quad 2\quad 3$

$13\times2\times3=78.$

(11)

$3)\frac{31}{9}, \frac{113}{18}, \frac{37}{36} = \frac{124}{36}, \frac{226}{36}, \frac{37}{36}.$

$3)3\quad 6\quad 12$

$2)1\quad 2\quad 4$

$1\quad 1\quad 2$

$3\times3\times2\times2=36.$

(12)

$5)\frac{32}{5}, \frac{87}{10}, \frac{49}{20} = \frac{128}{20}, \frac{174}{20}, \frac{49}{20}.$

$2)1\quad 2\quad 4$

$1\quad 1\quad 2$

$5\times2\times2=20.$

(13)

$11)\frac{59}{11}, \frac{135}{22}, \frac{2}{33} = \frac{354}{66}, \frac{405}{66}, \frac{4}{66}.$

$1\quad 2\quad 3$

$11\times2\times3=66.$

(14)

$17)\frac{9}{17}, \frac{71}{34}, \frac{73}{68} = \frac{36}{68}, \frac{142}{68}, \frac{73}{68}.$

$2)1\quad 2\quad 4$

$1\quad 1\quad 2$

$17\times2\times2=68.$

(15)

$3)\frac{52}{9}, \frac{113}{18}, \frac{7}{36}, \frac{1}{72} = \frac{416}{72}, \frac{452}{72}, \frac{14}{72}, \frac{1}{72}.$

$3)3\quad 6\quad 12\quad 24$

$2)1\quad 2\quad 4\quad 8$

$2)1\quad 1\quad 2\quad 4$

$1\quad 1\quad 1\quad 2$

$3\times3\times2\times2\times2=72.$

MULTIPLICATION OF FRACTIONS.

(1) $\frac{3}{7}\times 8=3\frac{3}{7}$. *Ans.*

(2) $\frac{8}{75}\times 12=1\frac{7}{25}$. *Ans.*

(3) $\frac{32}{40}\times 9=7\frac{1}{5}$. *A.*

(4) $1\frac{4}{19}\times 15=11\frac{1}{19}$. *Ans.*

(5) $\frac{75}{96}\times 12=9\frac{3}{8}$. *Ans.*

(6) $\frac{4}{5}$ of $\frac{4}{7}\times 35=16$. *Ans.*

(7) $3\frac{1}{2}$ of $\frac{2}{3}\times 14=32\frac{2}{3}$. *Ans.*

(8) $1\frac{3}{4}$ of $2\frac{1}{2}\times 16=70$. *Ans.*

(9) $2\frac{1}{5}$ of $\frac{2}{7}\times 70=44$. *Ans.*

(10) $4\frac{9}{6}$ of $\frac{8}{1}\times 36=1584$. *Ans.*

(12) $67\times 9\frac{1}{12}=608\frac{7}{12}$. *Ans.*

(13) $842\times 7\frac{1}{9}=5987\frac{5}{9}$. *Ans.*

(14) $360\times 12\frac{3}{5}=4536$. *Ans.*

(15) $460\times 11\frac{3}{4}=5405$. *Ans.*

(16) $620\times 10\frac{5}{4}=6975$. *Ans.*

(17) $1340\times 8\frac{3}{4}=11725$. *Ans.*

(1) $\frac{4}{9}\times 8=3\frac{5}{9}$. *Ans.*

(2) $15\times\frac{6}{7}=12\frac{6}{7}$. *Ans.*

(3) $11\times\frac{8}{15}=5\frac{13}{15}$. *Ans.*

(4) $7\frac{7}{8}\times 8=63$. *Ans.*

(5) $9\frac{1}{2}\times 18\frac{3}{4}=178\frac{1}{8}$. *Ans.*

(6) $3\frac{2}{7}\times 4\frac{14}{33}=14\frac{124}{231}$. *Ans.*

(7)
$\frac{175}{81} \times 9 = 19\frac{4}{9}$. *Ans.*

(8)
$\frac{3}{4} \times \frac{3}{5} = \frac{9}{20}$. *Ans.*

(9)
$\frac{7}{8} \times \frac{3}{5} = \frac{21}{40}$. *Ans.*

(10)
$\frac{1}{4}$ of $\frac{3}{8} \times \frac{5}{9} = \frac{5}{96}$. *Ans.*

(11)
$\frac{5}{12} \times \frac{9}{20}$ of $\frac{6}{27} = \frac{1}{24}$. *Ans.*

(12)
$\frac{1}{2}$ of $\frac{7}{8} \times \frac{4}{7}$ of $\frac{6}{10} = \frac{3}{20}$. *Ans.*

(13)
$\frac{7}{8} \times 16 = 14$. *Ans.*

(14)
$\frac{28}{1} \times \frac{9}{14} = 18$. *Ans.*

(15)
$\frac{21}{25} \times 18 = 15\frac{3}{25}$. *Ans.*

(16)
$8\frac{7}{10} \times 15 = 130\frac{1}{2}$. *Ans.*

(17)
$\frac{6}{11}$ of $\frac{2}{3} \times \frac{10}{24} = \frac{10}{66}$. *Ans.*

(18)
$5\frac{1}{4} \times \frac{4}{5}$ of $3\frac{1}{3} = 14$. *Ans.*

(19)
$842\frac{1}{4} \times 7\frac{1}{2} = 6316\frac{7}{8}$. *Ans.*

(20)
$\frac{5}{6} \times \frac{6}{7} = \frac{10}{21}$. *A.*

(21)
$\frac{9}{10} \times 7\frac{7}{11} = 6\frac{48}{55}$. *A.*

(22)
$\frac{16}{21} \times \frac{3}{4}$ of $\frac{7}{15} = \frac{4}{15}$. *A.*

(23)

11	7	2
7 23	22	2
49	46	
7	4 = $\frac{4}{7}$. *Ans.*	

(24)

3	27	14
	28	9
5	13	6
	30	26
	15	1 = $\frac{1}{15}$. *Ans.*

(25)

	17	12 4
3	9	2
	1	17
	3	8 = $2\frac{2}{3}$. *Ans.*

(26)

1	6	2
3	2	
1	5	
1	20 = 20. *Ans.*	

(27)

8	1	
6	1	
1	3	53
7	106	
56	53 = $\frac{53}{56}$. *Ans.*	

(28)

3	9	2
	5	3
4	6	5
	7	23
	84	23 = $\frac{23}{84}$. *A.*

(29)
1 | 5
3 | 2
7 | 2
5 | 8 5
6 | 25
21 | 50 = $2\frac{8}{21}$. *Ans.*

(30)
1 | 14
6 | 5
5 | 4 3
1 | 9
7 | 45
1 | 540 = 540. *Ans.*

(31)
4 | 3
7
4 | 21 = $\$5\frac{1}{4}$.

(32)
7 | 8 2
4 | 51
7 | 102 = $\$14\frac{4}{7}$. *A.*

3 (33) 2
9 | 16
8 | 3
3 | 2 = $\$\frac{2}{3}$. *A.*

4 (34)
8 | 5 9
1 | 18
4 | 45 = $11\frac{1}{4}$ *ton.*

2 (35)
16 | 15 3
1 | 24
2 | 45 = $\$22\frac{1}{2}$. *A.*

(36)
8 | 7
2 | 7
16 | 49 = $\$3\frac{1}{8}$. *A.*

(37) 4
3 1 | 16
12 | 11
3 | 44 = $\$14\frac{2}{3}$.

(38)
4 | 5
8 | 49
32 | 245 = $\$7\frac{21}{32}$. *A.*

(39)
2 | 5
8 | 27
16 | 135 = $\$8\frac{7}{16}$. *A.*

(40) 5
| 75
15 | 11
| 55 *cts.* *Ans.*

3 (41) 103
15 | 11$3
11 | 5
3 | 103 = $\$34\frac{1}{3}$. *A.*

(42) 4
1 | 56
14 | 9
| 36 = $\$36$. *A.*

(43)
2 | 35
2 | 5
4 | 175 = $43\frac{3}{4}s$.

(44) 13
5 | 104 25
8 | 125
| $325. *Ans.*

3 (45)
6 | 5
3 | 2
9 | 5 = $\$\frac{5}{9}$. *Ans.*

5 (46)
2 15 | 7 3
14 | 9
10 | 3 = $\frac{3}{10}$. *A.*

2 (47) 3
4 10 | 9
12 | 5
8 | 3 = $\$\frac{3}{8}$. *Ans.*

(48)
3 | 2
12 | 11
2 6 | 4
16 | 15
24 | 11 = $\$\frac{11}{24}$. *Ans.*

(49)
4 | 39 13
3 | 2 4
5 | 16
5 | 104 = $20⅘. *Ans.*

(50)
2 | 45 5
9 | 5
2 | 25 = 12½ days. *A.*

(51)
20 | 1 16
3 | 320
3 | 16 = 5⅓ hours. *Ans.*

(52)
5 | 16 2
8 | 167
5 | 334 = $66⅘. *Ans.*

(53)
2 | 7 34
7 | 68
| 34 miles. *Ans.*

(54)
4 | 125 25
5 | 73
4 | 1825 = 456¼ cents.

(55)
2 4 | 75 25
6 | 73
8 | 1825 = 228⅛ cents. *Ans.*

(56)
8 | 5
3 | 307
24 | 1535 = $63 23/24.

(57)
16 | 289
5 | 3
80 | 867 = $10 67/80. *A.*

(58)
| 15000 3000
5 | 4
| $12000. *A.*

(59)
7 | 3
5 | 3
35 | 9 = 9/35 A's.
3/7 − 9/35 = 6/35 B's.

(60)
8 | 7
3 5 | 4
9 | 5
7 | 6
3 | 1 = ⅓ D's share.

(61)
| 200 40
5 | 3
| 120 acres A's.
3 | 2
3 | 240 = 80 acres B's.
4 | 1
12 | 240 = 20 acres C's.

DIVISION OF FRACTIONS.

(1)

$$\begin{array}{r|l} 5\ \cancel{15} & \cancel{21} \\ \cancel{7} & 1 \\ \hline 5 & 1 = \frac{1}{5}. \end{array}$$ *Ans.*

(2)

$$\begin{array}{r|l} 2\ 14 & \cancel{9}\ 3 \\ \cancel{6} & 1 \\ \hline 28 & 3 = \frac{3}{28}. \end{array}$$ *Ans.*

(3)

$$\begin{array}{r|l} 15 & 13 \\ 9 & 1 \\ \hline 135 & 13 = \frac{13}{135}. \end{array}$$ *Ans.*

(4)

$$\begin{array}{r|l} 319 & \cancel{120}\ 3 \\ \cancel{40} & 1 \\ \hline 319 & 3 = \frac{3}{319}. \end{array}$$ *Ans.*

(5)

$$\begin{array}{r|l} 64 & 23 \\ 13 & 1 \\ \hline 832 & 23 = \frac{23}{832}. \end{array}$$ *Ans.*

(6)

$$\begin{array}{r|l} 1 & 5 \\ 7 & 10 \\ \hline 7 & 50 = 7\frac{1}{7}. \end{array}$$ *Ans.*

(7)

$$\begin{array}{r|l} 1 & 27\ 9 \\ \cancel{3} & 4 \\ \hline & 36 = 36. \end{array}$$ *Ans.*

(8)

$$\begin{array}{r|l} 8 & 1 \\ 1 & 7 \\ \hline 8 & 7 = \frac{7}{8}. \end{array}$$ *Ans.*

(9)

$$\begin{array}{r|l} 5\ \cancel{10} & \cancel{9}\ 3 \\ \cancel{3} & \cancel{8}\ 4 \\ \hline 5 & 12 = 2\frac{2}{5}. \end{array}$$ *Ans.*

(10)

$$\begin{array}{r|l} 40\ \cancel{80} & \cancel{45}\ 9 \\ \cancel{5} & \cancel{14}\ 7 \\ \hline 40 & 63 = 1\frac{23}{40}. \end{array}$$ *Ans.*

(11)

$$\begin{array}{r|l} 3 & 2 \\ 3\ 5 & \cancel{4}\ 2 \\ \cancel{6} & 7 \\ 3 & 4 \\ \hline 135 & 112 = \frac{112}{135}. \end{array}$$ *Ans.*

(12)

$$\begin{array}{r|l} 4\ \cancel{8} & \cancel{7}\ 3 \\ \cancel{7} & \cancel{6} \\ 4 & 5 \\ 8 & 9 \\ \hline 128 & 135 = 1\frac{7}{128}. \end{array}$$ *Ans.*

(13)

$\frac{8}{3}$	$\frac{3}{2}$
$\frac{3}{4}$	2
$\frac{4}{5}$	$\frac{5}{6}$
5	2 = $\frac{2}{5}$. *Ans.*

(14)

1	56
11	12
11	672 = $61\frac{1}{11}$. *Ans.*

(15)

	$\frac{1000}{133}$	25
2 $\frac{80}{80}$		
2	3325 = $1662\frac{1}{2}$. *Ans.*	

(16)

1	$\frac{72\frac{5}{2}}{47}$	29
$\frac{25}{25}$		
	1363 = 1363. *Ans.*	

(17)

8	$\frac{3\frac{5}{5}}{1}$	7
$\frac{5}{5}$		
8	7 = $\frac{7}{8}$. *Ans.*	

(18)

11	$\frac{10\frac{4}{4}}{1}$	26
3 $\frac{12}{12}$		
33	26 = $\frac{26}{33}$. *Ans.*	

(19)

$\frac{3}{3}$	1	11
2	$\frac{3\frac{3}{3}}{7}$	
29		
58	77 = $1\frac{19}{58}$. *Ans.*	

(20)

6	55
1	2
7	1
42	110 = $2\frac{13}{21}$. *Ans.*

(21)

$\frac{6}{6}$	5	
1	$\frac{5\frac{0}{0}}{3}$	25
13		
13	125 = $9\frac{8}{13}$. *Ans.*	

(22)

7		
5 $\frac{2\frac{8}{8}}{2\frac{5}{5}}$	$\frac{8A0\frac{5}{5}}{4}$	1681
35	1681 = $48\frac{1}{35}$. *Ans.*	

(23)

7	4
4	$\frac{15}{2}$
19	20
$\frac{15}{15}$	2
133	40 = $\frac{40}{133}$. *Ans.*

(24)

8	79
25	3
200	237 = $1\frac{37}{200}$. *Ans.*

(25)

	9	5
11	11	7
	55	9
121		7 = $\frac{7}{121}$. *Ans.*

(26)

	17	12	3
	4	1	
17		3 = $\frac{3}{17}$. *Ans.*	

(27)

	27	20	4
	5	1	
27		4 = $\frac{4}{27}$. *Ans.*	

(28)

5	75	60
2	8	1
10		1 = $\frac{1}{10}$. *Ans.*

(29)

	521	4342	9
	48	1	
521		9 = $\frac{9}{521}$. *Ans.*	

(30)

	125	42	2
	21	1	
125		2 = $\frac{2}{125}$. *Ans.*	

(31)

	1	36	4
	9	10	
		40. *Ans.*	

(32)

	1	420	140
	3	8	
		1120. *Ans.*	

(33)

5	20	9	3
	3	8	2
5		6 = $1\frac{1}{5}$. *Ans.*	

(34)

5	25	14	2
	7	15	3
5		6 = $1\frac{1}{5}$. *Ans.*	

(35)

	3	2	
10	50	27	9
	20	27	
500		243 = $\frac{243}{500}$. *Ans.*	

(36)

9	7
15	16
135	112 = $\frac{112}{135}$. *Ans.*

(37)

	5	3	
3	9	8	4
	6	7	
	3	4	
135		112 = $\frac{112}{135}$. *Ans.*	

(38)

	2	1	
	4	1	
	3	2	
2	1	8	3
	4	9	
2		3 = $1\frac{1}{2}$. *Ans.*	

(39)

2	1	13
100	127	
2	1651	

$1651 = 825\frac{1}{2}$. *Ans.*

(40)

1	1273
17	56
17	71288

$71288 = 4193\frac{7}{17}$. *Ans.*

(41)

32	4324	1081
128	475	
32	513475	

$513475 = 16046\frac{3}{32}$.

(42)

9	56
8	1
9	7

$7 = \frac{7}{9}$. *Ans.*

(43)

21	9	56
42	112	
189	56	

$56 = \frac{56}{189}$. *Ans.*

(44)

3	6	
19	19	
3	1	

$1 = \frac{1}{3}$. *Ans.*

(45)

7	1	20
35	8	
7	160	

$160 = 22\frac{6}{7}$. *Ans.*

(46)

11	33	
71	231	1453
	333	37
781	53761	

$53761 = 68\frac{653}{781}$. *Ans.*

(47)

3	9	10
100	1000	
3	10	

$10 = 3\frac{1}{3}$. *Ans.*

(48)

239	5	478
478	956	
1195	1434	

$1434 = 1\frac{239}{1195}$. *Ans.*

(49)

6	43
3	6
3	2
9	86

$86 = 9\frac{5}{9}$. *Ans.*

(50)

2	5	13013
4	260260	
90	5	
	1	
180	13013	

$13013 = 72\frac{53}{180}$. *Ans.*

(51)

4	32
1	6
4	21

$21 = 5\frac{1}{4}$ *lbs.* *Ans.*

(52)

8	7
4	5
32	35

$35 = 1\frac{3}{32}$ yards. *Ans.*

(53)

$$\begin{array}{r|l} 2\ \cancel{16} & \cancel{9}\ 3 \\ \cancel{3} & \cancel{8} \\ \hline 2 & 3 = 1\tfrac{1}{2} \text{ bush. } \textit{Ans.} \end{array}$$

(54)

$$\begin{array}{r|l} 2\ \cancel{10} & 9 \\ 1 & \cancel{5} \\ \hline 2 & 9 = 4\tfrac{1}{2} \text{ horses. } \textit{Ans.} \end{array}$$

(55)

$$\begin{array}{r|l} 2\ 5 & \cancel{3} \\ \cancel{6} & 7 \\ \hline 10 & 7 = \$\tfrac{7}{10}. \ \textit{Ans.} \end{array}$$

(56)

$$\begin{array}{r|l} 7 & 6 \\ 5 & 18 \\ \hline 35 & 108 = \$3\tfrac{3}{35}. \ \textit{Ans.} \end{array}$$

(57)

$$\begin{array}{r|l} 5 & 2 \\ 3 & 8 \\ \hline 15 & 16 = \$1\tfrac{1}{15}. \ \textit{Ans.} \end{array}$$

58)

$$\begin{array}{r|l} \cancel{7} & \cancel{12}\ 6 \\ \cancel{2} & \cancel{7} \\ \hline & 6 \text{ gallons. } \textit{Ans.} \end{array}$$

(59)

$$\begin{array}{r|l} 6\ \cancel{54} & \cancel{35}\ 5 \\ \cancel{7} & 9 \\ \hline 6 & 5 = \tfrac{5}{6} \text{ of the whole.} \end{array}$$

(60)

$$\begin{array}{r|l} \cancel{4} & \cancel{63}\ 21 \\ \cancel{3} & \cancel{4} \\ \hline & 21. \ \textit{Ans.} \end{array}$$

(61)

$$\begin{array}{r|l} 8\ \cancel{16} & \cancel{146}\ 73 \\ & 3 \\ \hline 8 & 219 = 27\tfrac{3}{8}. \ \textit{Ans.} \end{array}$$

(62)

$$\begin{array}{r|l} \cancel{5} & 2601\ 2 \\ 369 & \cancel{10} \\ \hline 369 & 5202 = 14\tfrac{12}{123}. \ \textit{Ans.} \end{array}$$

(63)

$$\begin{array}{r|l} \cancel{8} & \cancel{5} \\ \cancel{5} & \cancel{8} \\ 3 & 7 \\ 121 & 8 \\ \hline 363 & 56 = \tfrac{56}{363}. \ \textit{Ans.} \end{array}$$

(64)

$$\begin{array}{r|l} 25\ \cancel{75} & \cancel{42}\ 2 \\ \cancel{7} & \\ \hline 25 & 2 = \$\tfrac{2}{25}. \ \textit{Ans.} \end{array}$$

(65)

$$\begin{array}{r|l} 7\ \cancel{21} & \cancel{3} \\ & 2 \\ \hline 49 & 2 = \$\tfrac{2}{49}. \ \textit{Ans.} \end{array}$$

(66)

$$\begin{array}{r|l} & 3 \\ 4 & 7 \\ \hline 4 & 21 = \$5\tfrac{1}{4}. \ \textit{Ans.} \end{array}$$

(7)

$1\frac{5}{16}$ of a square mile $= 600A.$
$36\frac{7}{9}$ acres $= 36A.\ 3R.\ 4\frac{4}{9}P.$
$563A.\ 0R.\ 35\frac{5}{9}P.$ *Ans.*

(8)

$\frac{6}{7}$ of a ton $= 17cwt.\ 0qr.\ 7lb.\ 2\frac{2}{7}oz.$
$\frac{5}{9}$ of 12 *cwt.* $= 6cwt.\ 2qr.\ 16lb.\ 10\frac{2}{3}oz.$
$10cwt.\ 1qr.\ 15lb.\ 7\frac{13}{21}oz.$ *Ans.*

(9)

$1\frac{3}{4}$ pound Troy $= 1lb.\ 9oz.\ 0pwt.\ 0gr.$
$\frac{1}{8}$ of an ounce $= 3pwt.\ 8gr.$
$1lb.\ 8oz.\ 16pwt.\ 16gr.$ *Ans.*

(10)

$2\frac{3}{8}$ cords $= 2$ *cords* 3 *cord ft.* 0 *c. ft.*
$\frac{3}{4}$ of a cord ft. $= 12$ *c. ft.*
2 *cords* 2 *cord ft.* 4 *c. ft.* *Ans.*

(11)

$\frac{1}{6}$ of a yard $= 6in.\ 0bar.$
$\frac{2}{3}$ of an inch $= 2bar.$
$5in.\ 1bar.$ *Ans.*

(12)

$\frac{1}{3}$ of $\frac{3}{4}$ of a ℔ $= 4\ ℥\ 4\ ʒ\ 0\ ℈\ 0gr.$
$\frac{4}{5}$ of $\frac{1}{3}$ of a ʒ $= 16gr.$
$4\ ℥\ 3\ ʒ\ 2\ ℈\ 4gr.$ *Ans.*

(13)

1 ounce avoirdupois $= 437\frac{1}{2}$ Troy grains; 1 ounce Troy $= 480$ ains; $480 - 437\frac{1}{2}$ Troy grains $= 1pwt.\ 18\frac{1}{2}$ grains. *Ans.*

(81)

5	22	2
11	2	
5	4 = $\frac{4}{5}$.	*Ans.*

(82)

	2540	508
3	4	3
5	0	
	$6096.	*Ans.*

(83)

3	0	65
0	325	2
5	6	
3	130 = 43\frac{1}{3}$.	*Ans.*

(84)

14	131	
5	7	2
3	4	
15	262 = $17\frac{7}{15}$ weeks.	*A.*

COMPLEX FRACTIONS.

(1)

6 | 5	
4 | 5	
24 | 25 = $1\frac{1}{24}$.	*Ans.*

(2)

9 | 8	
15 | 16	
135 | 128 = $\frac{128}{135}$.	*Ans.*

(3)

9 | 14	
9 | 16	
81 | 224 = $2\frac{62}{81}$.	*Ans.*

(4)

2	175	25
7	8	4
	100.	*Ans.*

(5)

9 | 8	
9 | 2	
81 | 16 = $\frac{16}{81}$.	*Ans.*

(6)

7	00	5
12	1	
7	5 = $\frac{5}{7}$.	*Ans.*

(7)

4	32	5
11	55	
	8	
4 | 5 = $1\frac{1}{4}$.		*Ans.*

(8)

1	20	5
4	7	
	35.	*Ans.*

(7) $\frac{175}{81}\times 9=19\frac{4}{9}$. *Ans.*

(8) $\frac{3}{4}\times\frac{3}{5}=\frac{9}{20}$. *Ans.*

(9) $\frac{7}{8}\times\frac{3}{5}=\frac{21}{40}$. *Ans.*

(10) $\frac{1}{4}$ of $\frac{3}{8}\times\frac{5}{9}=\frac{5}{96}$. *Ans.*

(11) $\frac{5}{12}\times\frac{9}{20}$ of $\frac{6}{27}=\frac{1}{24}$. *Ans.*

(12) $\frac{1}{2}$ of $\frac{7}{8}\times\frac{4}{7}$ of $\frac{6}{10}=\frac{3}{20}$. *Ans.*

(13) $\frac{7}{8}\times 16=14$. *Ans.*

(14) $\frac{28}{1}\times\frac{9}{14}=18$. *Ans.*

(15) $\frac{21}{25}\times 18=15\frac{3}{25}$. *Ans.*

(16) $8\frac{7}{10}\times 15=130\frac{1}{2}$. *Ans.*

(17) $\frac{6}{11}$ of $\frac{2}{3}\times\frac{10}{24}=\frac{10}{66}$. *Ans.*

(18) $5\frac{1}{4}\times\frac{4}{5}$ of $3\frac{1}{3}=14$. *Ans.*

(19) $842\frac{1}{4}\times 7\frac{1}{2}=6316\frac{7}{8}$. *Ans.*

(20) $\frac{5}{9}\times\frac{6}{7}=\frac{10}{21}$. *A.*

(21) $\frac{9}{10}\times 7\frac{7}{11}=6\frac{48}{55}$. *A.*

(22) $\frac{16}{21}\times\frac{3}{4}$ of $\frac{7}{15}=\frac{4}{15}$. *A.*

(23)

11	7 2
7 23	22 2
49	46
7	4=$\frac{4}{7}$. *Ans.*

(24)

3 27	14
28	9
5 13	6
30	26
15	1=$\frac{1}{15}$. *Ans.*

(25)

3 17	12 4
9	2
1	17
3	8=$2\frac{2}{3}$. *Ans.*

(26)

1	6 2
3	2
1	5
1	20=20. *Ans.*

(27)

8	1
6	1
1	3 53
7	106
56	53=$\frac{53}{56}$. *Ans.*

(28)

3 9	2
4 5	3
8	5
7	23
84	23=$\frac{23}{84}$. *A.*

(29)
1 | 5
3 | 2
7 | 2
5 | 8
6 | 25
21 | 50 = $2\frac{8}{21}$. *Ans.*

(30)
1 | 14
6 | 5
5 | 4 3
1 | 9
7 | 45
1 | 540 = 540. *Ans.*

(31)
4 | 3
7
4 | 21 = $\$5\frac{1}{4}$.

(32)
7 | 8 2
4 | 51
7 | 102 = $\$14\frac{4}{7}$. *A.*

3 (33) 2
9 | 16
8 | 3
3 | 2 = $\$\frac{2}{3}$. *A.*

4 (34)
8 | 5 9
1 | 18
4 | 45 = $11\frac{1}{4}$ *ton.*

2 (35)
16 | 15 3
1 | 24
2 | 45 = $\$22\frac{1}{2}$. *A.*

(36)
8 | 7
2 | 7
16 | 49 = $\$3\frac{1}{16}$. *A.*

(37) 4
1 | 16
3 12 | 11
3 | 44 = $\$14\frac{2}{3}$.

(38)
4 | 5
8 | 49
32 | 245 = $\$7\frac{21}{32}$. *A.*

(39)
2 | 5
8 | 27
16 | 135 = $\$8\frac{7}{16}$. *A.*

(40) 5
| 75
15 | 11
| 55 *cts.* *Ans.*

3 (41)
15 | 11 33 103
11 | 5
3 | 103 = $\$34\frac{1}{3}$. *A.*

(42) 4
1 | 56
14 | 9
| 36 = $\$36$. *A.*

(43)
2 | 35
2 | 5
4 | 175 = $43\frac{3}{4}s$.

(44)
5 | 104 13
8 | 125 25
| $325. *Ans.*

3 (45)
6 | 5
3 | 2
9 | 5 = $\$\frac{5}{9}$. *Ans.*

5 (46)
2 15 | 7 3
14 | 9
10 | 3 = $\frac{3}{10}$. *A.*

2 (47) 3
4 10 | 9
12 | 5
8 | 3 = $\$\frac{3}{8}$. *Ans.*

(48)
3 | 2
12 | 11
2 5 | 4
16 | 15
24 | 11 = $\$\frac{11}{24}$. *Ans.*

(49)

~~4~~	~~39~~	13
~~3~~	2	
5	~~16~~	4
5	104 = 20\frac{4}{5}$. *Ans.*	

(50)

2	~~45~~	5
~~9~~	5	
2	25 = $12\frac{1}{2}$ days. *A.*	

(51)

~~20~~	1	
3	~~320~~	16
3	16 = $5\frac{1}{3}$ hours. *Ans.*	

(52)

5	~~16~~	2
~~8~~	167	
5	334 = 66\frac{4}{5}$. *Ans.*	

(53)

~~2~~	~~7~~	
~~7~~	~~68~~	34
	34 miles. *Ans.*	

(54)

4	~~125~~	25
~~5~~	73	
4	1825 = $456\frac{1}{4}$ cents.	

(55)

2 4	~~75~~	25
~~6~~	73	
8	1825 = $228\frac{1}{8}$ cents. *Ans.*	

(56)

8	5	
3	307	
24	1535 = 63\frac{23}{24}$.	

(57)

16	289	
5	3	
80	867 = 10\frac{67}{80}$. *A.*	

(58)

	~~15000~~	3000
~~5~~	4	
	$12000. *A.*	

(59)

7	3	
5	3	
35	9 = $\frac{9}{35}$ A's.	
$\frac{3}{7}-\frac{9}{35}=\frac{6}{35}$ B's.		

(60)

~~8~~	~~7~~	
3 ~~5~~	~~4~~	
~~9~~	~~5~~	
~~7~~	~~6~~	
3	1 = $\frac{1}{3}$ D's share.	

(61)

	~~200~~	40
~~5~~	3	
	120 acres A's.	
3	2	
3	240 = 80 acres B's.	
4	1	
12	240 = 20 acres C's.	

DIVISION OF FRACTIONS.

(1)

$$\begin{array}{r|l} 5\ \cancel{15} & \cancel{21} \\ \cancel{7} & 1 \\ \hline 5 & 1 = \frac{1}{5}. \end{array}$$ *Ans.*

(2)

$$\begin{array}{r|l} 2\ 14 & \cancel{9}\ 3 \\ \cancel{6} & 1 \\ \hline 28 & 3 = \frac{3}{28}. \end{array}$$ *Ans.*

(3)

$$\begin{array}{r|l} 15 & 13 \\ 9 & 1 \\ \hline 135 & 13 = \frac{13}{135}. \end{array}$$ *Ans.*

(4)

$$\begin{array}{r|l} 319 & \cancel{120}\ 3 \\ \cancel{40} & 1 \\ \hline 319 & 3 = \frac{3}{319}. \end{array}$$ *Ans.*

(5)

$$\begin{array}{r|l} 64 & 23 \\ 13 & 1 \\ \hline 832 & 23 = \frac{23}{832}. \end{array}$$ *Ans.*

(6)

$$\begin{array}{r|l} 1 & 5 \\ 7 & 10 \\ \hline 7 & 50 = 7\frac{1}{7}. \end{array}$$ *Ans.*

(7)

$$\begin{array}{r|l} 1 & 27\ 9 \\ \cancel{3} & 4 \\ \hline & 36 = 36. \end{array}$$ *Ans.*

(8)

$$\begin{array}{r|l} 8 & 1 \\ 1 & 7 \\ \hline 8 & 7 = \frac{7}{8}. \end{array}$$ *Ans.*

(9)

$$\begin{array}{r|l} 5\ \cancel{10} & \cancel{9}\ 3 \\ \cancel{3} & \cancel{8}\ 4 \\ \hline 5 & 12 = 2\frac{2}{5}. \end{array}$$ *Ans.*

(10)

$$\begin{array}{r|l} 40\ \cancel{80} & \cancel{45}\ 9 \\ \cancel{5} & \cancel{14}\ 7 \\ \hline 40 & 63 = 1\frac{23}{40}. \end{array}$$ *Ans.*

(11)

$$\begin{array}{r|l} 3 & 2 \\ 3\ 5 & \cancel{4}\ 2 \\ \cancel{6} & 7 \\ 3 & 4 \\ \hline 135 & 112 = \frac{112}{135}. \end{array}$$ *Ans.*

(12)

$$\begin{array}{r|l} 4\ \cancel{8} & \cancel{7}\ 3 \\ \cancel{7} & \cancel{6} \\ 4 & 5 \\ 8 & 9 \\ \hline 128 & 135 = 1\frac{7}{128}. \end{array}$$ *Ans.*

(13)

$	$
$	2
$	4
5	$
5	2 = $\frac{2}{5}$. *Ans.*

(14)

1	56
11	12
11	672 = $61\frac{1}{11}$. *Ans.*

(15)

	1000	25
2 $\phi\phi$	133	
2	3325 = $1662\frac{1}{2}$. *Ans.*	

(16)

	1	725
29	25	47
	1363 = 1363. *Ans.*	

(17)

	8	35
7	$	1
8	7 = $\frac{7}{8}$. *Ans.*	

(18)

	11	104
26 3	12	1
33	26 = $\frac{26}{33}$. *Ans.*	

(19)

	$	1
	2	33
11	29	7
58	77 = $1\frac{19}{58}$. *Ans.*	

(20)

6	55
1	2
7	1
42	110 = $2\frac{13}{21}$. *Ans.*

(21)

	$	5
	1	$\phi\phi$ 25
	13	3
13	125 = $9\frac{8}{13}$. *Ans.*	

(22)

	7	
	5 28	$\phi 40\phi$ 1681
	25	4
35	1681 = $48\frac{1}{35}$. *Ans.*	

(23)

7	4
4	15
19	20
19	2
133	40 = $\frac{40}{133}$. *Ans.*

(24)

8	79
25	3
200	237 = $1\frac{37}{200}$. *Ans.*

(25)

	9	5
11	11	7
	55	9
121		7 = $\frac{7}{121}$. *Ans.*

(26)

	17	12 3
	4	1
17		3 = $\frac{3}{17}$. *Ans.*

(27)

	27	20 4
	5	1
27		4 = $\frac{4}{27}$. *Ans.*

(28)

5	75	60
2	8	1
10		1 = $\frac{1}{10}$. *Ans.*

(29)

	521	432 9
	48	1
521		9 = $\frac{9}{521}$. *Ans.*

(30)

	125	42 2
	21	1
125		2 = $\frac{2}{125}$. *Ans.*

(31)

	1	36 4
	9	10
		40. *Ans.*

(32)

	1	420 140
	3	8
		1120. *Ans.*

(33)

5	20	9 3
	3	8 2
5		6 = 1$\frac{1}{5}$. *Ans.*

(34)

5	25	14 2
	7	15 3
5		6 = 1$\frac{1}{5}$. *Ans.*

(35)

	3	2
10	50	27 9
	20	27
500		243 = $\frac{243}{500}$. *Ans.*

(36)

9	7
15	16
135	112 = $\frac{112}{135}$. *Ans.*

(37)

	5	3
3	9	8 4
	6	7
	3	4
135		112 = $\frac{112}{135}$. *Ans.*

(38)

	2	1
	4	1
	3	2
2	1	8 3
	4	9
2		3 = 1$\frac{1}{2}$. *Ans.*

(39)

2	1 | ϕϕϕ	13
ϫϕϕ	127	
2	1651 = $825\frac{1}{2}$. *Ans.*	

(40)

1	1273
17	56
17	71288 = $4193\frac{7}{17}$. *Ans.*

(41)

32	ϰϩϩϰ	1081
ϫϩϩ	475	
32	513475 = $16046\frac{3}{32}$.	

(42)

9	ϕϕ
ϕ	1
9	7 = $\frac{7}{9}$. *Ans.*

(43)

21	9 | ϫϫϩ	56
ϰϩ	1	
189	56 = $\frac{56}{189}$. *Ans.*	

(44)

3	ϕ | ϫϕ
ϫϕ	2
3	1 = $\frac{1}{3}$. *Ans.*

(45)

7	1 | ϫϕϕ	20
ϯϯ	8	
7	160 = $22\frac{6}{7}$. *Ans.*	

(46)

71	11 | ϯϯ	1453
ϩϫϯ	ϯϯϯ	37
781	53761 = $68\frac{653}{781}$. *Ans.*	

(47)

3	ϕ | ϫϕϕϕ	10
ϫϕϕ	ϯ	
3	10 = $3\frac{1}{3}$. *Ans.*	

(48)

239	5 | ϕϯϕ	478
ϰϩϯ	3	
1195	1434 = $1\frac{239}{1195}$. *Ans.*	

(49)

ϕ	43
3	ϕ
3	2
9	86 = $9\frac{5}{9}$. *Ans.*

(50)

2	ϯ | ϩϕϕϩ	13013
ϰ	ϯ	
90	1	
180	13013 = $72\frac{53}{180}$. *Ans.*	

(51)

4	ϯϩ | 21	
1	ϕ	
4	21 = $5\frac{1}{4}$ *lbs.* *Ans.*	

(52)

8	7
4	5
32	35 = $1\frac{3}{32}$ yards. *Ans.*

(53)

$$\begin{array}{r|l} 2\ \cancel{16} & \cancel{9}\ 3 \\ \cancel{3} & \cancel{8} \\ \hline 2 & 3 = 1\tfrac{1}{2} \text{ bush. } \textit{Ans.} \end{array}$$

(54)

$$\begin{array}{r|l} 2\ \cancel{10} & 9 \\ 1 & \cancel{5} \\ \hline 2 & 9 = 4\tfrac{1}{2} \text{ horses. } \textit{Ans.} \end{array}$$

(55)

$$\begin{array}{r|l} 2\ 5 & \cancel{3} \\ \cancel{6} & 7 \\ \hline 10 & 7 = \$\tfrac{7}{10}. \ \textit{Ans.} \end{array}$$

(56)

$$\begin{array}{r|l} 7 & 6 \\ 5 & 18 \\ \hline 35 & 108 = \$3\tfrac{3}{35}. \ \textit{Ans.} \end{array}$$

(57)

$$\begin{array}{r|l} 5 & 2 \\ 3 & 8 \\ \hline 15 & 16 = \$1\tfrac{1}{15}. \ \textit{Ans.} \end{array}$$

58)

$$\begin{array}{r|l} \cancel{7} & \cancel{12}\ 6 \\ \cancel{2} & \cancel{7} \\ \hline & 6 \text{ gallons. } \textit{Ans.} \end{array}$$

(59)

$$\begin{array}{r|l} 6\ \cancel{54} & \cancel{35}\ 5 \\ \cancel{7} & 9 \\ \hline 6 & 5 = \tfrac{5}{6} \text{ of the whole.} \end{array}$$

(60)

$$\begin{array}{r|l} \cancel{4} & \cancel{63}\ 21 \\ \cancel{3} & \cancel{4} \\ \hline & 21. \ \textit{Ans.} \end{array}$$

(61)

$$\begin{array}{r|l} 8\ \cancel{16} & \cancel{146}\ 73 \\ & 3 \\ \hline 8 & 219 = 27\tfrac{3}{8}. \ \textit{Ans.} \end{array}$$

(62)

$$\begin{array}{r|l} \cancel{5} & 2601\ 2 \\ 369 & \cancel{10} \\ \hline 369 & 5202 = 14\tfrac{12}{123}. \ \textit{Ans.} \end{array}$$

(63)

$$\begin{array}{r|l} \cancel{8} & \cancel{5} \\ \cancel{5} & \cancel{8} \\ 3 & 7 \\ 121 & 8 \\ \hline 363 & 56 = \tfrac{56}{363}. \ \textit{Ans.} \end{array}$$

(64)

$$\begin{array}{r|l} 25\ \cancel{75} & \cancel{42}\ 2 \\ \cancel{7} & \\ \hline 25 & 2 = \$\tfrac{2}{25}. \ \textit{Ans.} \end{array}$$

(65)

$$\begin{array}{r|l} 7\ 7 & \cancel{3} \\ \cancel{21} & 2 \\ \hline 49 & 2 = \$\tfrac{2}{49}. \ \textit{Ans.} \end{array}$$

(66)

$$\begin{array}{r|l} & 3 \\ 4 & 7 \\ \hline 4 & 21 = \$5\tfrac{1}{4}. \ \textit{Ans.} \end{array}$$

(67)

3	~~9~~	~~1488~~ 496
	17	2
	51	992 = $19\frac{23}{51}$ *lbs. A.*

(68)

5	~~4~~	~~555~~ 37
	~~75~~	~~8~~ 2
	5	74 = $14\frac{4}{5}$ barrels. *Ans.*

(69)

	9	~~32~~ 4
	~~8~~	
	9	4 = $\$\frac{4}{9}$. *Ans.*

(70)

	8	61
	8	
	64	61 = $\$\frac{61}{64}$. *Ans.*

(71)

	3	~~32~~ 8
	~~4~~	5
	3	40 = $\$13\frac{1}{3}$. *Ans.*

(72)

	16	~~1351~~ 193
	~~7~~	9
	16	1737 = $108\frac{9}{16}$ *bu. Ans.*

(73)

4	~~16~~	~~81~~ 3
	~~27~~	~~4~~
	4	3 = $\frac{3}{4}$ *yd. Ans.*

(74)

	~~7~~	~~880~~ 2
	~~440~~	~~14~~ 2
		4 days. *Ans.*

(75)

	2	~~63~~ 7
	~~9~~	7
	2	49 = $24\frac{1}{2}$ bottles. *A.*

(76)

	9	~~143~~ 13
	~~11~~	
	9	13 = $1\frac{4}{9}$ days. *Ans.*

(77)

		~~6~~ 3
2	~~4~~	7
	2	21 = $\$10\frac{1}{2}$. *Ans.*

(78)

2	~~9~~	~~81~~ 9
	~~8~~	~~4~~
	2	9 = $4\frac{1}{2}$. *Ans.*

(79)

		~~48~~ 6
	~~8~~	~~5~~
	~~5~~	~~9~~
	~~9~~	
		6. *Ans.*

(80)

	~~2~~	~~63~~ 21
	~~3~~	1
	4	5
	8	105 = $13\frac{1}{8}$ times. *Ans.*

(81)
5 | 22 2
11 | 2
5 | 4 = $\frac{4}{5}$. *Ans.*

(82)
| 2540 508
3 | 4 3
5 | 9
| $6096. *Ans.*

3 (83) 65
9 | 325 2
5 | 6
3 | 130 = 43\frac{1}{3}$. *Ans.*

(84)
14 | 131
5 | 7 2
3 | 4
15 | 262 = $17\frac{7}{15}$ weeks. *A.*

COMPLEX FRACTIONS.

(1)
6 | 5
4 | 5
24 | 25 = $1\frac{1}{24}$. *Ans.*

(2)
9 | 8
15 | 16
135 | 128 = $\frac{128}{135}$. *Ans.*

(3)
9 | 14
9 | 16
81 | 224 = $2\frac{62}{81}$. *Ans.*

(4)
2 | 175 25
7 | 8 4
| 100. *Ans.*

(5)
9 | 8
9 | 2
81 | 16 = $\frac{16}{81}$. *Ans.*

(6)
7 | 60 5
12 | 1
7 | 5 = $\frac{5}{7}$. *Ans.*

4 (7) 5
32 | 355
11 | 8
4 | 5 = $1\frac{1}{4}$. *Ans.*

(8)
1 | 20 5
4 | 7
| 35. *Ans.*

(9)

$$\begin{array}{r|l} 9\ \cancel{99} & \cancel{400}\ 50 \\ 61\ \cancel{488} & \cancel{77}\ 7 \\ \hline 549 & 350=\frac{350}{549}.\ \textit{Ans.} \end{array}$$

(10)

$$\begin{array}{r|l} 7\ \cancel{35} & \cancel{918}\ 306 \\ 17\ \cancel{51} & \cancel{5} \\ \hline 119 & 306=2\frac{68}{119}.\ \textit{Ans.} \end{array}$$

(11)

$$\begin{array}{r|l} 7\ \cancel{5} & \cancel{279}\ 93 \\ \cancel{42} & \cancel{40}\ 4 \\ \hline 7 & 372=53\frac{1}{7}.\ \textit{Ans.} \end{array}$$

(12)

$$\begin{array}{r|l} 2\ 8 & \cancel{5} \\ \cancel{10} & 3 \\ 4 & \cancel{39}\ 3 \\ \cancel{13} & 1 \\ \hline 64 & 9=\frac{9}{64}.\ \textit{Ans.} \end{array}$$

APPLICATIONS.

(1)

$$\begin{array}{r|l} \cancel{6} & 1 \\ \cancel{7} & 3 \\ \cancel{5} & \cancel{4}\ 5 \\ 1 & \cancel{50} \\ \cancel{4} & \cancel{21} \\ \hline & \$15.\ \textit{Ans.} \end{array}$$

(2)

$$\begin{array}{r|l} 5 & \cancel{33}\ 11 \\ \cancel{3} & 8 \\ \hline 5 & 88=\$17\frac{3}{5}.\ \textit{A.} \end{array}$$

(3)

$$\begin{array}{r|l} 7\ 5 & \cancel{387}\ 129 \\ \cancel{21} & 2 \\ \hline 35 & 258=7\frac{13}{35}\ \text{miles.}\ \textit{A.} \end{array}$$

(4)

$$\frac{2}{9}\times\frac{34}{3}=\frac{68}{27};\ \frac{68}{27}-\frac{6}{13}=\frac{722}{351};\ \frac{722}{351}\times\frac{83}{4}=\frac{59926}{1404}=42\frac{479}{702}.\ \textit{Ans.}$$

(5)

$$\frac{1}{3}+\frac{1}{5}+\frac{1}{7}+\frac{1}{9}=\frac{248}{315};\ \frac{248}{315}\times\frac{3}{4}=\frac{62}{105};\ \frac{1}{4}+\frac{1}{6}+\frac{1}{8}=\frac{13}{24};$$
$$\frac{62}{105}-\frac{13}{24}=\frac{41}{840}.\ \textit{Ans.}$$

(6)

$$\frac{\overset{19}{\cancel{57}}}{\underset{2}{\cancel{8}}}\times\frac{5}{\cancel{3}}\times\frac{\overset{5}{\cancel{20}}}{9}=\frac{475}{18}=\$26\frac{7}{18}.\ \textit{Ans.}$$

(7)

$$\frac{2}{3}\times\frac{8}{7}=\$\frac{16}{21}\ \text{price of 1 yard};\ \frac{\overset{5}{\cancel{80}}}{\cancel{7}}\times\frac{\overset{3}{\cancel{21}}}{\cancel{16}}=15\ \text{yards.}\ \textit{Ans.}$$

(8)

3 | 14 7
2 | 7
3 | 49 = $16⅓. *Ans.*

(9)

7 | 101
16 | 4
4 | 3
5 | 7
7 | 5
9 | 1
112 | 101 = 101/112. *Ans.*

(10)

$$\frac{49\frac{5}{8}}{97}+\frac{34\frac{3}{5}}{146\frac{3}{11}}=\frac{397}{776}+\frac{1903}{8045}=\frac{4670593}{6242920}\text{ sum;}$$

$$\frac{397}{776}-\frac{1903}{8045}=\frac{1717137}{6242920}\text{ Diff.}$$

(11)

3 | 20
1 | 5
3 | 100 = 33⅓ *bu.*

(12)

⅔ of a league = 2*mi.* 0*fur.* 00*rd.*
7/10 of a mile = 5*fur.* 24*rd.*
1*mi.* 2*fur.* 16*rd.*

(13)

4/7 of a *cwt.* = 2*qr.* 7*lb.* 2*oz.* 4 4/7 *dr.*
8 5/6 pounds = 8*lb.* 13*oz.* 5⅓ *dr.*
1*qr.* 23*lb.* 4*oz.* 11 5/21 *dr.* *Ans.*

(14)

4 9/10 miles = 4*mi.* 7*fur.* 8*rd.*
2/7 of a fur. = 11*rd.* 2*yd.* 1 1/4 *ft.*
3/5 of 1½ *yds.* = 2 7/10 *ft.*
4*mi.* 7*fur.* 19*rd.* 2*yd.* 3 2/5 7/10 *ft.* *Ans.*

(15)

3 5/9 | 18 3 61
5
3 | 61 = 20⅓. *Ans.*

(16)

8 | 29
29 | 4 37
3 | 74
3 | 37 = $12⅓. *Ans.*

(17)

634 − 124 = 510, which is 5/6 of 2¼ = 15/8 times B's number;
510 ÷ 15/8 = 272 B's number. *Ans.*

(18)

25	9	13
9	225	
	13 *yds.*	*A.*

(19)

47	5	282 141
	94	
	235	141 = $\frac{3}{5}$. *A.*

(20)

8	33	2
3	16	
11	7	
	14 bushels.	*Ans.*

(21)

$100 \div 14\frac{2}{3} = 6\frac{9}{11}$; $27\frac{3}{4} - 6\frac{9}{11} = 20\frac{41}{44}$. *Ans.*

(22)

$\frac{3}{7}$ of \$6300 = \$2700 A's share; $\frac{4}{9}$ of \$6300 = \$2800 B's share; 2700 + 2800 = \$5500; 6300 − 5500 = \$800, C's share. *Ans.*

(23)

$\frac{3}{4} - \frac{3}{5} = \frac{3}{20}$; $1 - \frac{3}{20} = \frac{17}{20}$; since 1 diminished by $\frac{3}{20}$ of itself leaves $\frac{17}{20}$ of itself, *any number* diminished by $\frac{3}{20}$ of itself will leave $\frac{17}{20}$ of itself; hence, 34 is $\frac{17}{20}$ of the required number;

$34 \div \frac{17}{20} = 40$. *Ans.*

(24)

$\frac{1}{3}$ of a week	= 2*da.*	8*hr.*	
$\frac{1}{4}$ of a day	=	6*hr.*	
$\frac{1}{2}$ of an hour	=		30*m.*
	2*da.*	14*hr.*	30*m.* *Ans.*

(25)

$\frac{2}{7}$ of £15	= £4	5*s.*	8*d.*	$2\frac{2}{7}$ *far.*
£$3\frac{3}{7}$	= £3	8*s.*	6*d.*	$3\frac{3}{7}$ *far.*
$\frac{1}{3}$ of $\frac{5}{7}$ of $\frac{3}{5}$ of £1	=	2*s.*	10*d.*	$1\frac{1}{7}$ *far.*
$\frac{2}{3}$ of $\frac{3}{7}$ of a shilling	=		3*d.*	$1\frac{5}{7}$ *far.*
	£7	17*s.*	5*d.*	$0\frac{4}{7}$ *far.* *Ans.*

(26)

John must have 6 shares and James 8 shares of the marbles, and both must have 14 shares; therefore, John has $\frac{6}{14}$ of 56 = 24 marbles, and James $\frac{8}{14}$ of 56 = 32 marbles. *Ans.*

(27)

$\frac{3}{7}$ of $2000 = 857\frac{1}{7}$ acres ; $\frac{2}{3}$ of $857\frac{1}{7} = 571\frac{3}{7}$ acres sold ;
$857\frac{1}{7} - 571\frac{3}{7} = 285\frac{5}{7}$ acres retained. *Ans.*

(28)

$\frac{1}{3}$ of $240 = 80$, A's ; $\frac{1}{10}$ of $240 = 24$, B's ; $\frac{1}{8}$ of $240 = 30$, C's ; $\frac{1}{6}$ of $240 = 40$, D's ; $80 + 24 + 30 + 40 = 174$; $240 - 174 = 66$, the remainder.

(29)

$\frac{1}{3}$ of $3740 = \$1246\frac{2}{3}$; $1246\frac{2}{3} + 156\frac{1}{3} = \$1403$, whole gain ;
$\$1403 \div 3 = \$467\frac{2}{3}$, annual gain. *Ans.*

(30)

$\frac{3}{4} + \frac{7}{8} = 1\frac{3}{8} = \$1\frac{5}{8}$, what they gave for it; $1\frac{5}{8} + \frac{7}{16} = \$2\frac{1}{16}$, what they sold it for ; the first paid 6 parts as often as the second paid 7 parts ; therefore, the first must have $\frac{6}{13}$ of $\frac{7}{16} = \$\frac{42}{208}$; and the second $\frac{7}{13}$ of $\frac{7}{16} = \$\frac{49}{208}$. *Ans.*

(31)

$\frac{5}{8}$ of $126\frac{6}{7} = 79\frac{2}{7}$ bushels ; $79\frac{2}{7} \times \$2\frac{1}{5} = \$174\frac{3}{7}$;
$126\frac{6}{7} - 79\frac{2}{7} = 47\frac{4}{7}$ bushels ; $47\frac{4}{7} \times 1\frac{3}{4} = \$\ 83\frac{1}{4}$;
$\$257\frac{19}{28}$. *Ans.*

(32)

$1\frac{4}{5} + \frac{3}{4} = \frac{51}{20} = \$2\frac{11}{20}$; $\$19\frac{1}{8} \div 2\frac{11}{20} = 7\frac{1}{2}$ bushels. *Ans.*

(33)

$\$492\frac{2}{3} = \frac{2}{13}$ of the capital ; $\$492\frac{2}{3} \div 2 = \$246\frac{1}{3}$, which is $\frac{1}{13}$ of the capital ; $\$246\frac{1}{3} \times 7 = \$1724\frac{1}{3}$ A's share ; $\$246\frac{1}{3} \times 5 = \$1231\frac{2}{3}$ B's share. *Ans.*

(34)

$63 \div \frac{7}{8} = 72$, what he had in the second field ; $\frac{5}{3}$ of $72 = 120$; $120 \div 4 = 30$, what he had in the third field ; $63 + 72 + 30 = 165$ sheep. *Ans.*

DUODECIMALS.

ADDITION AND SUBTRACTION.

(1)

$86' \div 12 = 7ft.\ 2'$. *Ans.*

(2)

$750'' \div 12 = 62'\ 6''$; $62' \div 12 = 5ft.\ 2'$;
$5ft.\ 2'\ 6''$. *Ans.*

(3)

$37000 \div 12 = 3083''\ 4'''$; $3083'' \div 12 = 256'\ 11''$; $256' \div 12$
$= 21ft.\ 4'$; $21ft.\ 4'\ 11''\ 4'''$. *Ans.*

(4)

$67' \div 12 = 5ft.\ 7'$. *Ans.*

(5)

$470''' \div 12 = 39''\ 2'''$; $39'' \div 12 = 3'\ 3''$;
$3'\ 3''\ 2'''$. *Ans.*

(6)

$375'' \div 12 = 31'\ 3''$; $31' \div 12 = 2ft.\ 7'$;
$2ft.\ 7'\ 3''$. *Ans.*

(7)

8*ft.*	9′	7″		
6*ft.*	7′	3″	4‴	
15*ft.*	4′	10″	4‴	*Ans.*

(8)

32*ft.*	6′	6″	0‴	
29*ft.*	0	0	7‴	
3*ft.*	6′	5″	5‴	*Ans.*

(9)

9*ft.*	6′	4″	3‴	
12	2	9	10	
26	0	5		
40	1	0	3	
ft.	10′	7″	4‴	*Ans.*

(10)

125*ft.*	0′	6″	0‴	
45	11	0	2	
12	6			
183*ft.*	5′	6″	2‴	*A.*

(11)

84*ft.*	7′	00″	00‴	
96	0	11	00	
42	6	9	10	
	5	7	11	
223*ft.*	8′	4″	9‴	*Ans.*

(12)

127*ft.*	3′	6″	4‴	11⁗	
40	0	10	7	5	
87*ft.*	2′	7″	9‴	6⁗	*A.*

(13)

425*ft.*	9′	10″	0‴	
107	10	9	8	
317*ft.*	11′	0″	4‴	*Ans.*

(14)

325*ft.*	7′	6″	2‴	
217	10	9	0	
543*ft.*	6′	3″	2‴	*sum.*
107*ft.*	8′	9″	2‴	*Diff.*

(15)

1001*ft.*	0′	0″	10‴	
720	10	9	1	
1721*ft.*	10′	9″	11‴	*sum.*
280*ft.*	1′	3″	9‴	*Diff.*

MULTIPLICATION.

(2)

9*ft.*	6′		
4	7		
38			
5	6′	6″	
43*sq. ft.*	6′	6″	*Ans.*

(3)

12*ft.*	5′		
6	8		
74	6′		
8	3′	4″	
82*sq. ft.*	9′	4″	*Ans.*

(4)

35*ft.*	4′	6″	
9	10′		
318	4′	6″	
29	5′	9″	
347*sq. ft.*	10′	3″	*A.*

(5)

45*ft.*	4′	3″			
12	2	9			
544	3′				
7	6′	8″	6‴		
2	10	0	2	3	
554*sq. ft.*	7′	8″	8‴	3⁗	*A.*

(6)

140*ft.*	0′	2″	4‴	
20	10			
2800	3′	10″	8‴	
116	8	1	11	4
2917*sq. ft.*	0′	0″	7‴	4⁗ *A.*

(7)

279*ft.*	10′	6″	
	8	4	
186*ft.*	7′		
7	9	3	6
194*sq. ft.*	4′	3″	6‴ *A.*

(8)

14*ft.*	6′	3″	
2	9		
29	0′	6″	
10	10	8	3‴
39*sq. ft.*	11′	2″	3‴ *A.*

(9)

18*ft.*	9′	
15	10	
281	3′	
15	7	6″
296*sq. ft.*	10′	6″ *Ans.*

(10)

70*ft.*	9′	
12	3	
849	0′	
17	8	3″
866*sq. ft.*	8′	3″ *Ans.*

(11)

64*ft.*	6′
64	6
4128	0′
32	3
4160*sq. ft.*	3′

$4160\frac{1}{4}$ *sq ft.* $\times ,05 = \$208,01\frac{1}{4}$ *Ans.*

(12)

6*ft.*	9′
4	8
27	0′
4	6
31	6′
2	10
63	0′
26	3
89*cu. ft.*	3′ *A.*

(13)

97*ft.*	4′
9	6
876	0′
48	8
924*sq. ft.*	8′

$924\frac{2}{3}$ *sq. ft.* $\div 9 = 102\frac{2}{27}$ *sq. yd.*;
$102\frac{2}{27} \times ,18 = \$18,49\frac{1}{3}$. *Ans.*

(14)

36*ft.*	5′	
6	8′	
218	6′	
24	3′	4″
242	9′	4″
3	6′	
728	4′	
121	4′	8″
849*cu. ft.*	8′	8″ *Ans.*

(15)

26*ft.*	8′
6	6′
160	0′
13	4′
173	4′
3	3′
520	0′
43	4′
563*cu. ft.*	4′

$563\frac{1}{3}$*cu. ft.* ÷ 128 = $4\frac{77}{192}$ cords;
$4\frac{77}{192} \times \$3{,}50 = \$15{,}403 +$ *Ans.*

(16)

38*ft.*	10′	
20	6′	
776	8′	
19	5′	
796	1′	
9	4′	
7164	9′	
265	4′	4″
27)7430 feet	1′	4″

$275\frac{46}{243}$ cubic yards. *Ans.*

(17)

22*ft.*	8′
22	8
18	9
18	9
84*ft.*	10
11	6
933	2′
42	5
975*sq. ft.*	7′ sides of the room.
425*sq. ft.*	ceiling of the room.
1400*sq. ft.*	7′
241	7
9)1159*sq. ft.*	0′

$128\frac{7}{9}$*sq. yds.* × ,16 = \$20,60$\frac{4}{5}$. *Ans.*

22*ft.*	8′	
18	9	
425*sq. ft.*	0′	
139*ft.*	4′	windows.
25	9′	doors.
78	6′	base.
241*sq. ft.*	7′	

DIVISION.

(1)

6*ft.* 4′)29*sq. ft.* 0′ 4″(4*ft.* 7′ *Ans.*

25	4		
3	8′	4″	
3	8′	4″	

(2)

9*ft.* 6′)49*sq. ft.* 0′ 10″ 6‴(5*ft.* 3′ 3″ *Ans.*

46	6′		
2	6′	10″	
2	4′	6″	
	2′	4″	6‴
	2′	4″	6‴

(3)

24*ft.* 3′)1176*sq. ft.* 1′ 6″(48*ft.* 6′. *Ans.*

1164	0′		
12	1′	6″	
12	1′	6″	

(4)

3*ft.* 4′)119*cu. ft.* 2′ 6″ 8‴(35*sq. ft.* 9′ 2″ *Ans.*

116	8′		
2	6′	6″	
2	6′		
		6″	8‴
		6″	8‴

4*ft.* 2′)35*sq. ft.* 9′ 2″(8*ft.* 7′. *Ans.*

33	4′		
2	5′	2″	
2	5′	2″	

(5)

3*ft.* 9′)105*cu. ft.* 5′ 7″ 6‴(28*ft.* 1′ 6″
105 0′
5′ 7″
3′ 9″
1′ 10″ 6‴
1′ 10″ 6‴

2*ft.* 3′)28*sq. ft.* 1′ 6″(12*ft.* 6′. *Ans.*
27 0′
1 1′ 6″
1 1′ 6″

(6)

10*ft.* 7′)394*sq.ft.*2′ 9″(37*ft.* 3′. *Ans.*
391 7′
2 7′ 9″
2 7′ 9″

(7)

17*ft.* 6′)27*sq. ft.* 8′ 6″(1*ft.* 7′. *Ans.*
17 6′
10 2′ 6″
10 2′ 6″

(8)

158*cu. yd.* 17*cu. ft.* 4′
27
42*ft.* 10′)4283*cu. ft.* 4′(100*sq. ft.*
4283 4′
12*ft.* 6′)100*ft.* 0′(8*ft.* *Ans.*
100 0′

DECIMAL FRACTIONS.

(1) .06. *Ans.* (2) 1.7. *Ans.* (3) .005. *Ans.*

(4) .27. *Ans.* (5) .047. *Ans.* (6) 6.41. *Ans.*

(7) 7.008. *Ans.* (8) 9.05. *Ans.* (9) 11.50. *Ans.* (10) 44.7. *Ans.*

(1) 27.4. *Ans.* (2) 36.015. *Ans.* (3) 99.0027. *Ans.*

(4) .320. *Ans.* (5) 200.000320. *Ans.* (6) .3610 *Ans.*

(7) 5.000003. *Ans.* (8) 40.0000009. *Ans.* (9) .4900. *Ans.*

(10) 59.0067. *Ans.* (11) .0469. *Ans.* (12) 79.000415. *Ans.*

(13) 67.0227. *Ans.* (14) 105.0000095. *Ans.*

(1) \$37.265. *A.* (2) \$17.005. *A.* (3) \$215.08. *A.* (4) \$275.005. *A.*

(5) \$9.008. *Ans.* (6) \$15.069. *Ans.* (7) \$27.182. *Ans.*

ADDITION OF DECIMALS.

(1)	(2)	(3)
1306.1805. *Ans.*	528.697893. *Ans.*	159.37. *Ans.*
(4)	(5)	(6)
1.5415. *Ans.*	446.0924. *Ans.*	27.2087. *Ans.*
(7)	(8)	(9)
88.76257. *Ans.*	71.010. *Ans.*	1835.599. *Ans.*
(10)	(11)	(12)
397.547. *Ans.*	31.02464. *Ans.*	1.110129. *Ans.*
(13)	(14)	(15)
204.0278277. *Ans.*	400.33269960. *Ans.*	.1008879. *Ans.*
(16)	(17)	(18)
$85.463. *Ans.*	$1065.19. *Ans.*	3.8896 tons. *Ans.*
(19)	(20)	(21)
$427.835. *Ans.*	$19.215. *Ans.*	$670.875. *Ans.*

(22)
$30.286. *Ans.*

SUBTRACTION OF DECIMALS.

(1)	(2)	(3)
3278.	291.10001	10.00001
.0879	41.496	.111111
3277.9121. *Ans.*	249.60401. *Ans.*	9.888899. *Ans.*

(4)
57.49
5.768
51.722. *Ans.*

(5)
3.075
.3054
2.7696. *Ans.*

(6)
1745.3
173.45
1571.85. *Ans.*

(7)
.7
.0054
.6946. *Ans.*

(8)
1.00075.
.105
.89575. *Ans.*

(9)
754.355.
150.43
603.925 *Ans.*

(10)
1754.754
375.49478
1379.25922. *A.*

(11)
175.01
75.304
99.706. *Ans.*

(12)
35.49
17.541
17.949. *Ans.*

(13)
.7
.000007
.699993. *Ans.*

(14)
396.
67.0008
328.9992. *Ans.*

(15)
1.
.001
.999. *Ans.*

(16)
6374.
59.1
6314.9. *Ans.*

(17)
365.0075
.000005
365.007495. *A.*

(18
21.004
.0098
20.9942. *A.*

(19)
260.3609
.0000047
260.3608953. *Ans*

(20)
10.0302
.000019
10,030181. *A.*

(21)
2.03
.0006
2.0294. *Ans.*

(22)
1000.
.001
999.999. *Ans.*

(23)
2500.
.25
2499.75. *Ans.*

(24)
200.027
97.0120
103.0150. *Ans.*

(25)
1.
.5768
.4232. *Ans.*

(26)
127.25
84.125
116⅞
328.075

500.
328.075
171.925 acres. *Ans.*

(27)
700.
617.375
$ 82.625. *Ans.*

(28)
325.50
97.125
60.875
$483.500

510.10
483.50
$26.60. *Ans.*

(29)
225.025
98.18306
126.84194 tons. *Ans.*

(30)
1240.06
1867.985
3108.045
2346.865
$ 761.180 *Ans.*

(31)
1284.05
1284.05
2568.10
786.375
1781.725 *lbs. Ans.*

MULTIPLICATION OF DECIMALS.

(1)
.796875. *Ans.*

(2)
.263872. *Ans.*

(3)
.0000500. *Ans.*

(4)
1.50050. *Ans.*

(5)
26.99178. *Ans.*

(6)
10376.283913. *A.*

(7)
165235.5195. *A.*

(8)
.0206211250. *A.*

(9)
28033.797099. *A.*

(10) 175.26788356. *A.*

(11) .000432045770. *A.*

(12) 216.94165850. *A.*

(13) .000000000294. *A.*

(14) 18616.74. *A.*

(15) 933.8253150762. *A.*

(16) .00715248. *A.*

(17) .608785264. *A.*

(18) .02860992. *A.*

(19) 2.435141056. *Ans.*

(20) 1296. *Ans.*

(21) 312.5. *Ans.*

(22) .375. *Ans.*

(23) .0036. *Ans.*

(24) 148.28125 acres. *A.*

(25) 12.13035 feet. *Ans.*

(26) $24.0625. *A.*

(27) $3191.805625. *A.*

(28) $210.03125. *A.*

(29) $708.901875. *A.*

(30) $2.06525 gain. *A.*

(2) 258.13007. *Ans.*

(3) 162.521. *Ans.*

(4) 2757.89786. *Ans.*

(5) 3566159. *Ans.*

DIVISION OF DECIMALS.

(1) 2.22. *Ans.*

(2) .852. *Ans.*

(3) 33.331. *Ans.*

(4) 1.0001. *Ans.*

(5) 12420.5. *Ans.*

(6) .005. *Ans.*

(7) 4.25. *Ans.*

(8) .007. *Ans.*

(9) .75. *Ans.*

(10) 1.27. *Ans.*

(11) .015. *Ans.*

(12) 17.008. *Ans.*

(13)
25.05068
250.5068
2505.068
25050.68
250506.8

(14)
48.65961
4865.961
48659.61
486596.1
4865961.

(15)
41.622
416.22
4162.2
41622.
416220.
4162200.

(16)
254.7347748
25473.47748
254734.7748
2547347.748
25473477.48
254734774.8

(17) .13956463+. *A.*

(18) 1918.515+. *A.*

(19) .004735. *A.*

(20) 174.412033+. *A.*

(21) 69.7125. *A.*

(22) 1.36832+. *A.*

(23) 12976.81+. *A.*

(24) .004958+. *Ans.*

(25) 154.125÷25=6.165*cu. yds. A.*

(26) \$167.875÷17=\$9.875. *A.*

(27) \$97.223÷45.22=\$2.15. *A*

(28) \$232.655÷375.25=\$0.62. *A.*

(29) \$2.25÷.125=18*lbs. A.*

(30) 34÷4.25=8 suits. *A.*

(31) 366.52÷26.18=14 days. *A.*

(32) \$2.225+\$0.985+\$1.168=\$4.378; 242.979÷4.378 =55.5 bushels. *Ans.*

(33)

269 acres; $13574.204 cost of the whole; $13574.204÷269 =$50.4617+ average price per acre.

(34)

4379.837×6=$26279.022; 8345+26279.022=$34624.022 value of whole property; $3976.48+120=$4096.48 amount of debts; 34624.022−4096.48=$30527.542; 30527.542÷4 =$7631.8855 the eldest son's share; 30527.542−7631.8855 =$22895.6565; $22895.6565÷4=$5723.914375 each of the other sons' shares.

(2) 10970. *Ans.*

(3) 6200. *Ans.*

(4) 1000. *Ans.*

(5) 100. *Ans.*

(6)

10; 100; 1000; 30; 20; 2000; 12; 1200; 500000.

(3) 8.311+. *A.*

(4) 1.563+. *A.*

(5) 1.1604+. *A.*

(6) 16.119+. *A.*

(2) 79.1188. *Ans.*

(3) 35.2843. *Ans.*

(4) 11.5834036625. *Ans.*

(5) 3202.8870. *Ans.*

REDUCTION OF DECIMALS.

(1) .25; .5; .75. *Ans.*

(2) .8; .875; .3125. *Ans.*

(3) .375; .04. *Ans.*

(4) .015625; .2666+. *Ans.*

(5)

.125; .003. *Ans.*

(6)

.2571+; .4411+. *Ans.*

(7)

.23903+. *Ans.*

(8)

.07157+. *Ans.*

(9)

.4375; .078125. *Ans.*

(10)

.00448. *Ans.*

(11)

.536; .372. *Ans.*

(12)

.9. *Ans.*

(13)

.7333+. *Ans.*

(14)

.48375. *Ans.*

(15)

.5128+. *Ans.*

(16)

.5375; .5606+. *Ans.*

(17)

.1666+. *A.*

(18)

$\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{7}{8} \div \frac{3}{8}$ of $\frac{2}{4} = \frac{14}{9} = 1.555+$. *A.*

(19)

$\frac{7}{8}$ of $\frac{4}{22} = \frac{7}{44} = .15909+$. *Ans.*

(20)

$\frac{11}{20}$ of $87\frac{3}{11} = 32$ bush.; $\frac{9}{20}$ of $7 = \$\frac{63}{20}$; $\frac{63}{20} \times 32 = \$100.80$. *A.*

(21)

$\frac{8}{5} + 7\frac{1}{2} + 8\frac{3}{4} = \frac{357}{20} = \$17.85$. *Ans.*

(22)

$\frac{5}{4}$ of $18 + \frac{8}{11}$ of $\frac{11}{12} + 7\frac{4}{9} = \frac{1102}{36} = 30.611+$. *Ans.*

(23)

$\frac{3}{5}$ of $8\frac{3}{4} - \frac{2}{3}$ of $3\frac{1}{2} = \frac{1}{4} = .25$. *Ans.*

(24)

$\frac{16}{21} + \frac{17}{7} + \frac{2}{9} = \frac{179}{63} = 2.8412+$. *Ans.*

(1)
$.25=\frac{1}{4}$; $.75=\frac{3}{4}$. *Ans.*

(2)
$.125=\frac{1}{8}$; $.625=\frac{5}{8}$. *Ans.*

(3)
$105=\frac{21}{200}$; $.0025=\frac{1}{400}$. *A.*

(4)
$.8015=\frac{1603}{2000}$; $.6042=\frac{3021}{5000}$.

(5)
$.68375=\frac{547}{800}$. *Ans.*

(6)
$.01875=\frac{3}{160}$. *Ans.*

(7)
$.22575=\frac{301}{1600}$. *Ans.*

(8)
$.265625=\frac{17}{64}$. *Ans.*

(1)
$14dr.\div 16=.875oz.$; $875\div 16=.0546875lb.$ *Ans.*

(2)
$78d.\div 12=6.5s.$; $6.5\div 20=£.325.$ *Ans.*

(3)
$63pt.\div 2=31.5qt.$; $31.5\div 8=3.9375pk.$ *Ans.*

(4)
$9hr.\div 24=.375da.$ *Ans.*

(5)
$375678ft.\div 16\frac{1}{2}=22768.363rd.+$; $22768.363\div 320=71.1511mi.+$. *Ans.*

(6)
$19pwt.\div 20=.95oz.$; $7.95\div 12=.6625lb.$ *Ans.*

(7)
$8oz.\div 16=.5lb.$; $7.5\div 25=.3qr.$; $.3\div 4=.075cwt.$; $3.075\div 20=.15375\,T.$ *Ans.*

(8)

2.45*s.*÷20=£.1225. *Ans.*

(9)

1.047*R.*÷4=.26175*A.* *Ans.*

(10)

176.9*yd.*÷5½=32.16354*rd.*+; 32.16354÷40=.804088*fur.*+ .804088÷8=100511*mi.* *Ans.*

(11)

14*lb.*÷25=.56*qr.*; 2.56÷4=.64*cwt.* *Ans.*

(12)

16*gr.*÷24=.66666*pwt.*+; 18.66666÷20=.933333*oz.*+; 10.933333÷12=.9111111*lb.* *Ans.*

(13)

2*na.*÷4=.5*qr.*; 3.5÷4=.875*yd.* *Ans.*

(14)

1*gal.*÷63=.01587.*hhd.*+. *Ans.*

(15)

43*sec.*÷60=.716666*m.*+; 6.716666÷60=.1119444*hr.*; 17.1119444÷24=.7129975*da.* *Ans.*

(16)

2.6*qr.*÷4=.65*cwt.*; 4.65÷20=.2325 *T.* *Ans.*

(17)

2*far.*÷4=.5*d.*; 5.5÷12=.46833*s.*; 19.46833÷20 =£.97291+. *Ans.*

(18)

37*P.*÷40=.925*R.*; 1.925÷4=.48125*A.* *Ans.*

(19)

3*na.*÷4=.75*qr.*; 2.75÷5=.55 *E. E.* *Ans.*

(20)

$6.5in. \div 12 = .54666 + ft.$; $2.54666 \div 3 = .848888yd.$;
$2.848888 \div 5\frac{1}{2} = .5179797rd.$; $.5179797 \div 40 = .0129494fur.$;
$.0129494 \div 8 = .0016186mi.$ *Ans.*

(21)

$22.5'' \div 60 = .375'$; $15.375' \div 60 = .25625°$. *Ans.*

(22)

$290c.\ in. \div 1728 = .167824 + ft.$; $167824 \div 40 = .041956\ ton.$

(23)

$3pk. \div 4 = .375bu.$; $3.375 \div 36 = .10416chal.$ *Ans.*

(24)

$6in. \div 12 = .5ft.$; $1.5 \div 3 = .5yd.$; $17.5 \div 5\frac{1}{2} = 3.181818rd.$;
$3.181818 \div 40 = .07954545fur.$; $.07954545 \div 8$
$= .00994318mi.$ *Ans.*

(25)

$9.5mo. \div 12 = .7833 + yr.$ *Ans.*

(26)

$16gr. \div 24 = .6666pwt.$; $18.6666 \div 20 = .9333oz.$;
$10.9333 \div 12 = .9111lb.$ *Ans.*

(27)

$14P. \div 40 = .35R.$; $1.35R. \div 4 = .3375A.$ *Ans.*

(28)

$45pk. \div 4 = 11.25bu.$; $11.25 \div 36 = .3125chal.$ *Ans.*

(29)

$72yd. \div 5\frac{1}{2} = 13.090rd.$; $13.0909 \div 40 = .32727fur.$;
$32727 \div 8 = .0409mi.$ *Ans.*

(30)

$9 \div 24 = .375$; $.375 \div 20 = .01875$ *ream.* *Ans.*

(31)

$4.0125in. \div 12 = .33445ft.$; $.33445 \div 16\frac{1}{2} = .02026rd.$ *Ans.*

(32)

$2da. \div 7 = .2857 + wk.$; $10.2857 \div 4 = .25714mo.$; $.25714 \div 12 = .02142yr.$ *Ans.*

(33)

$10gr. \div 20 = .5$ ℈; $1.5 \div 3 = .5$ ℥; $1.5 \div 8 = .1875$ ℔; $4.1875 \div 12 = .3489$ ℔. *Ans.*

(34)

$1.75pt. \div 2 = .875qt.$; $3.875 \div 4 = .96875gal.$; $.96875 \div 63 = .01537 + hhd.$ *Ans.*

(35)

$1.8sq.\,ft. \div 9 = .2sq.\,yd.$; $24.2 \div 30\frac{1}{4} = .8P.$; $.8 \div 40 = .02R.$; $.02 \div 4 = .005A.$ *Ans.*

(36)

$.36in. \div 2\frac{1}{4} = .16na.$; $1.16 \div 4 = .29qr.$; $2.29 \div 4 = .5725yd.$

(37)

$3''' \div 12 = .25''$; $8.25'' \div 12 = .6875'$; $4.6875 \div 12 = .390625ft.$; $3.390625ft.$ *Ans.*

(1)

$.6725cwt. \times 4 = 2.69qr.$; $.69 \times 25 = 17.25lb.$; $.25 \times 16 = 4.oz.$; $2qr.\ 17lb.\ 4oz.$ *Ans.*

(2)

$.61pt. \times 2 = 1.22hhd.$; $.22 \times 63 = 13.86gal.$; $.86 \times 4 = 3.44qt.$; $1hhd.\ 13gal.\ 3.44qt.$ *Ans.*

(3)

£.83229 × 20 = 16.64583 ; .64583 × 12 = 7.7496*d.* ; .7496 × 4 = 2.99 + *far.* ; 16*s.* 7*d.* 2.99*far.* *Ans.*

(4)

.0625*bar.* × 36 = 2.25*gal.* ; .25 × 4 = 1*qt.* ; 2*gal.* 1*qt.* *Ans.*

(5)

.42857*mo.* × 4 = 1.71428*wk.* ; .71428 × 7 = 4.99996*da.* ;
.99996 × 24 = 23.99904*hr.* ; .99904 × 60 = 59.9424*m.* ;
.9424 × 60 = 56.5 + *sec.* ;
1*wk.* 4*da.* 23*hr.* 59*m.* 56.5*sec.* *Ans.*

(6)

.05*A.* × 4 = .20*R.* ; .20 × 40 = 8*P.* *Ans.*

(7)

.3375 *T.* × 20 = 6.75*cwt.* ; .75 × 4 = 3.*qr.* ; 6*cwt.* 3*qr.* *Ans.*

(8)

.875*pi.* × 2 = 1.75*hhd.* ; .75 × 63 = 47.25*gal.* ; .25 × 4 = 1*qt.* ;
1*hhd.* 47*gal.* 1*qt.* *Ans.*

(9)

.375*hhd.* × 54 = 20.25*gal.* ; .25 × 4 = 1*qt.* ; 20*gal.* 1*qt.* *Ans.*

(10)

.911111*lb.* × 12 = 10.933332*oz.* ; .933332 × 20 = 18.66664*pwt.* ;
.66664 × 24 = 15.99 + *gr.* ; 10*oz.* 18*pwt.* 15.99*gr.* *Ans.*

(11)

.675*E. E.* × 5 = 3.375*qr.* ; .375 × 4 = 1.3*na.* ; 3*qr.* 1.3*na.* *A.*

(12)

.001136 × 8 × 40 × 16½ = 5.99808*ft.* ; 99808 × 12 = 11.9 + *in.*
= 5*ft.* 11.9 + *in.* *Ans.*

(13)

$.000242 \times 640 \times 4 \times 40 = 24.78008 rd.$; $.78008 \times 30\frac{1}{4}$ $= 23.6192 sq.\ yd.$; $.6192 \times 9 = 5.5728 sq.\ ft.$; $.5728 \times 144$ $= 82.4 sq.\ in.+$; $24 sq.\ rd.\ 23 sq.\ yd.\ 5 sq.\ ft.\ 82.45 sq.\ in.$ *A.*

(14)

$.4629 Deg. \times 69\frac{1}{2} = 32.1715 mi.$; $.1715 \times 8 = 1.372 fur.$; $.372 \times$ $40 = 14.88 rd.$; $.88 \times 16\frac{1}{2} = 14.52 ft.$; $.52 \times 12 = 6.24 in.$; $32 mi.\ 1 fur.\ 14 rd.\ 14 ft.\ 6.24 in.$ *Ans.*

(15)

$.875 yd. \times 3 = 2.625 ft.$; $.625 \times 12 = 7.5 in.$; $2 ft.\ 7.5 in.$ *Ans.*

(16)

$.3489$ ℔ $\times 12 = 4.1868$ ℥ ; $.1868 \times 8 = 1.4944$ ʒ ; $.4944 \times 3$ $= 1.4832$ ℈ ; $.4832 \times 20 = 9.6 gr.+$; 4 ℥ 1 ʒ 1 ℈ $9.6 gr.$ *Ans.*

(17)

$.759 A. \times 4 = 3.036 R.$; $.036 \times 40 = 5.44 P.$; $.44 \times 30\frac{1}{4}$ $= 13.31 sq.\ yd.$; $3 R.\ 5 P.\ 13.31 sq.\ yd.$ *Ans.*

(18)

$.01875 \times 20 = .375$ quires ; $.375 \times 24 = 9.$ sheets. *Ans.*

(19)

$0055 T. \times 2 = .11 cwt.$; $.11 \times 4 = .44 qr.$; $.44 \times 25 = 11 lb.$ *A.*

(20)

$.625 s. \times 12 = 7.5 d.$; $.5 \times 4 = 2 far.$; $7 d.\ 2 far.$ *Ans.*

(21)

$.3375 A. \times 4 = 1.35 R.$; $.35 \times 40 = 14 P.$; $1 R.\ 14 P.$ *Ans.*

(22)

$.785 yr. \times 365\frac{1}{4} = 286.72125 da.$; $.72125 \times 24 = 17.3 hr.$; $.3 \times 60 = 18 m.$; $286 da.\ 17 hr.\ 18 m.$ Ans.

CIRCULATING DECIMALS.

(1) $1\frac{9}{50}=.06.$ *A.* (2) $\frac{13}{140}=.09285+.$ *A.* (3) $\frac{11}{320}=.034375.$ *A.*

(4) $1\frac{17}{1280}=.01328125.$ *A.* (5) $\frac{11}{370}=.029729+.$ *A.* (6) $\frac{17}{500}=.034.$ *A.*

(7) $\frac{7}{250}=.028.$ *Ans.* (8) $\frac{31}{720}=.043056+.$ *Ans.*

(3)

$.\overline{6}=\frac{2}{3}$; $.\overline{162}'=\frac{6}{37}$; $.\overline{769230}'=\frac{4070}{5291}$; $.\overline{945}'=\frac{35}{37}$; $.\overline{09}'=\frac{1}{11}$.

(4)

$.\overline{594405}'=\frac{66045}{1111111}=\frac{85}{143}$; $.\overline{36}'=\frac{4}{11}$; $.\overline{142857}'=\frac{5291}{37037}=\frac{1}{7}$.

(4)

$.13\overline{8}=\frac{5}{36}$; $7.5\overline{43}'=7\frac{269}{495}$; $04\overline{354}'=\frac{29}{666}$; $37.5\overline{4}'=37\frac{49}{90}$;
$.6\overline{75}'=\frac{223}{330}$; $.7\overline{54347}'=\frac{75434}{99999}$. *Ans.*

(5)

$.7\overline{5}'=\frac{34}{45}$; $.4\overline{38}'=\frac{217}{495}$; $.09\overline{3}'=\frac{7}{75}$; $4.7\overline{513}'=4\frac{1256}{1665}$;
$.009\overline{87}'=\frac{163}{16500}$; $.4\overline{5}=\frac{41}{90}$. *Ans.*

(2)

$\frac{210}{1120}=.1875'$. *Ans.*

(3)

$1\frac{4}{1160}=.0\overline{034482758620689655172413793 1}'$. *Ans.*

(4)

$\frac{12}{123}=.\overline{097560}'$; $\frac{80}{135}=.\overline{592}'$; $\frac{72}{135}=.5\overline{3}$. *Ans.*

(2)	(1)	(2)
2.4181818′	165.16‘416416′	.5‘333333′
.5‘925925′	.04‘040404′	.4‘757575′
.008‘497133′	.03‘777777′	1.7‘577577′

ADDITION AND SUBTRACTION OF CIRCULATING DECIMALS.

(2) 95.2‘829647′. *Ans.*

(3) 69.74‘203112′. *Ans.*

(4) 55.6‘209780437503′. *Ans.*

(5) 47.4‘754481′. *Ans.*

(6) 416.2‘5428763′+. *Ans.*

Ans.

(2) 45.7‘755′. *Ans.*

(3) 2.9‘957′. *Ans.*

(4) 5.09. *Ans.*

(5) .65‘370016280906′. *A.*

(6) 4.38‘20′. *Ans.*

(7) 4.619‘525′. *Ans.*

(8) 1.0923‘7. *Ans.*

(9) 1.3462‘937′. *Ans.*

MULTIPLICATION OF CIRCULATING DECIMALS

(2) 5.537805‘5. *Ans.*

(3) 1.093‘086′. *Ans.*

(4) 1.6411‘7. *Ans.*

(5) 1.7183‘39′. *Ans.*

(6) 1.4710‘037′. *Ans.*

(7) 6.16566. *Ans.*

(8) 11.‘068735402′. *Ans.*

(9) .81654‘168350′. *Ans.*

DIVISION OF CIRCULATING DECIMALS.

(2) 13.570413'961038'. *Ans.*

(3) 35.028'1. *Ans.*

(4) 7.719'54'. *Ans.*

(5) 26.7837'428571'. *Ans.*

(6) 3.1'45'. *Ans.*

(7) 3.'8235294117647058'. *Ans.*

(8) 1.2'6. *Ans.*

(9) 15.48'423'. *Ans.*

CONTINUED FRACTIONS.

(1)

$$\frac{21}{39}=\frac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{6}}}}.$$

(2)

$$\frac{47}{65}=\frac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{3}}}}}}}.$$

(3)

$$\frac{17}{27}=\frac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\frac{1}{3}}}}}.$$

(4)

$$\frac{67}{85}=\frac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}}}}}.$$

(5)

$$\frac{37}{87}=\frac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5+\frac{1}{2}}}}}.$$

RATIO AND PROPORTION.

(1)
$(19\times10)\div5=38$. *Ans.*

(2)
$(14\times24)\div6=56$. *Ans.*

(3)
$(16\times9)\div12=12$. *Ans.*

(4)
$(16\times20)\div8=40$. *Ans.*

(5)
$(48\times90)\div45=96$. *Ans.*

(2)
$\frac{4}{6}=\frac{2}{3}$. *Ans.*

(3)
$\frac{5}{10}=\frac{1}{2}$. *Ans.*

(4)
$\frac{17}{34}=\frac{1}{2}$. *Ans.*

(5)
$\frac{300}{450}=\frac{2}{3}$. *Ans.*

(6)
$\frac{16}{96}=\frac{1}{6}$. *Ans.*

(7)
$\frac{8}{12}=\frac{2}{3}$. *Ans.*

(8)
$\frac{16}{48}=\frac{1}{3}$. *Ans.*

(9)
$\frac{18}{90}=\frac{1}{5}$. *Ans.*

(10)
$\frac{15}{165}=\frac{1}{11}$. *Ans.*

(11)
$\frac{9}{11}$. *Ans.*

(1)
8 : 110 : : \$24 : x.

\$	110	3
x	~~24~~	
	\$330. *Ans.*	

(2)
2 : 12 : : 15 : x.

~~2~~	15	6
x	~~12~~	
	\$90. *Ans.*	

(3)
6 : 18 : : 168 : x.

~~6~~	168	3
x	~~18~~	
	504 miles. *Ans.*	

(4)
8 : 13 : \$1,28 : x.

~~8~~	~~1,28~~	16
x	13	
	\$208. Ans.	

(5)

300 : 125 : : $2100 : x.

$$\begin{array}{r|l} \cancel{300} & \cancel{2100}^{\,7} \\ x & 125 \\ \hline & \$875. \end{array} \quad \textit{Ans.}$$

(6)

120 : 36 : : 330 : x.

$$\begin{array}{r|l} \cancel{120} & 33\cancel{0}^{\,3} \\ x & \cancel{36} \\ \hline & 99 \text{ pounds.} \end{array} \quad \textit{Ans.}$$

(7)

80 : 650 : $340 : x.

$$\begin{array}{r|l} {}^{4}\cancel{80} & \cancel{340}^{\,17} \\ x & 650 \\ \hline 4 & 11050{,}00 \\ \hline & \$2762{,}50. \end{array} \quad \textit{Ans.}$$

(8)

1 : 400 : : 5 : x.

$$\begin{array}{r|l} 1 & 5 \\ x & 400 \\ \hline & \$20{,}000. \end{array} \quad \textit{Ans.}$$

(9)

6*gal.* : 6*hhd.* : : $1,95 : x,

$$\begin{array}{r|l} \cancel{6} & 1{,}95 \\ x & \cancel{378}^{\,63} \\ \hline & \$122{,}85. \end{array} \quad \textit{Ans.}$$

(10)

16 : 40 : : 560 : x.

$$\begin{array}{r|l} \cancel{16} & \cancel{560}^{\,35} \\ x & 40 \\ \hline & 1400 \textit{ lbs.} \end{array} \quad \textit{Ans.}$$

(11)

12 : 313 : : 630 : x.

$$\begin{array}{r|l} \cancel{12} & \cancel{630}^{\,105} \\ x & \cancel{314}^{\,157} \\ \hline & 16485. \end{array} \quad \textit{Ans.}$$

(12)

2 : (3×25) : : $3,25 : x.

$$\begin{array}{r|l} 2 & 3{,}25 \\ x & 75 \\ \hline 2 & 243{,}75 \\ \hline & \$121{,}87\tfrac{1}{2}. \end{array} \quad \textit{Ans.}$$

(13)

3 : 36 : : 18 : x.

$$\begin{array}{r|l} \cancel{3} & \cancel{18}^{\,6} \\ x & 36 \\ \hline & 216 \text{ shillings.} \end{array} \quad \textit{A.}$$

(14)

8*s.* 4*d.* : 7*s.* 6*d.* : : 8 : x.

$$\begin{array}{r|l} {}^{10}\cancel{100} & \cancel{90}^{\,9} \\ x & 8 \\ \hline 10 & 72 \\ \hline & 7\tfrac{1}{5} \text{ ounces.} \end{array} \quad \textit{A.}$$

(15)

5*A*. 1*R*. 16*P*. : 125*A*. 2*R*. 20*P*. : : $150,5 : *x*.

```
214 ~~856~~ | ~~20100~~ 5025
      x | 150,5
    ---------------
    214 | 756262,5
    ---------------
        $3533,932+.  Ans.
```

(16)

13*cwt*. 2*qr*. : 9*cwt*. : : $129,93 : *x*.

```
~~54~~ |     ~~36~~ 2
  x | ~~129,93~~ 43,31
  ---------------------
    | $86,62. Ans.
```

(17)

750 : 10500 : : £2834 5*s*. : *x*.

```
~~750~~ | 56685
  20 | ~~10500~~ 14
   x |
  ---------------
  20 | 793590
  ---------------
     £39679,10s.  Ans.
```

(18)

3*yd*. 2*qr*. : 8*yd*. 3*qr*. : : $15,75 : *x*.

```
2 ~~14~~ | 15,75
   x |     ~~35~~ 5
   ---------------
   2 | 78,75
   ---------------
     $39,37½.  Ans.
```

(19)

.5 : .95 : : $201,5 : *x*.

```
   | 201,5
.~~5~~ |   ~~.95~~ 1.9
  x |
  ---------------
  | $382,85.  Ans.
```

(20)

3.5 : 26.25 : : $8,40 : *x*.

```
~~3.5~~ |  ~~8,40~~ 1.68
   x | ~~26,25~~ 37.5
   ---------------
   | $63.  Ans.
```

(21)

2.5 tons : 1*cwt.* : : \$1,80 : *x*.

~~4500~~	~~1,80~~	.04
x	~~100~~	
	\$0,04.	*Ans.*

(22)

$\frac{3}{4}$: $\frac{7}{8}$: : \$2,16 : *x*.

~~8~~	~~2,16~~	.09
~~3~~	7	
x	4	
	\$2,52.	*Ans.*

(23)

$\frac{5}{7}$*oz.* : $1\frac{1}{2}$*oz.* : : $\frac{11}{12}$: *x*.

4 ~~12~~	11	
2	~~3~~	
5	7	
x		
40	77,00	
	\$1,925.	*Ans.*

(24)

$14\frac{2}{3}$*lb.* : $16\frac{4}{5}$*lb.* : : \$$1\frac{5}{6}$: *x*.

2 ~~6~~	~~11~~	21
5	~~84~~	
~~44~~	~~3~~	
10	21	
	\$2,10.	*Ans.*

(25)

$14\frac{1}{2}$*yd.* : $39\frac{3}{8}$: : \$$19\frac{1}{3}$: *x*.

2 ~~3~~	~~58~~	105
~~8~~	~~315~~	
~~29~~	~~2~~	
x		
2	105	
	\$52,50.	*Ans.*

(26)

$\frac{7}{8}$*bar.* : $\frac{11}{14}$*bar.* : : \$$\frac{9}{11}$: *x*.

7 ~~11~~	9	
~~14~~	~~11~~	4
7	~~8~~	
49	$36=\frac{36}{49}$.	*Ans.*

(27)

$\frac{3}{16}$: $\frac{15}{32}$: : \$2880 : *x*.

2	~~2880~~	1440
~~32~~	~~15~~	5
~~3~~	~~16~~	
x		
	\$7200.	*Ans.*

(28)

462*yd.* : $116\frac{1}{4}$*yd.* : : \$150,66 : *x*.

	150,66	155
154 4 ~~462~~	~~465~~	
x		
616	23352.3	
	\$37,909+.	Ans.

(29)

$7\frac{7}{11}$*bar.* : $32\frac{2}{5}$*bar.* : : \$$31\frac{1}{4}$: *x*.

2 ~~4~~	~~125~~ 25
~~5~~	~~162~~ 41
84	11
168	11275
	\$67,113+. *Ans.*

(30)

\$$1,93\frac{3}{4}$: \$$96\frac{7}{8}$: : 2*bu.* 1*pk.* : *x*.

~~4~~	9
8	~~775~~ 100
~~7,75~~	~~4~~
x	
8	900
	$112\frac{1}{2}$*bu.* *Ans.*

(31)

$\frac{5}{8}$*yd.* : $7\frac{1}{2}$*yd.* : : \$$1\frac{5}{9}$: *x*.

3 ~~9~~	14
~~2~~	~~15~~ 4
~~5~~	~~8~~
x	
3	56
	\$$18,66\frac{2}{3}$. *Ans.*

(32)

44.3*yd.* : 37.09*yd.* : : \$72,25 : *x*.

~~47.5~~	~~37,05~~ 19.5
x	~~72,25~~ 2.89
	\$56,355. *Ans.*

(33)

3 : 160 : : 2 : *x*.

3	160
x	2
3	320
	$106\frac{2}{3}$*yds.* *Ans.*

(34)

$\frac{1}{2}$*g.* : £21 : : 1*wk.* : *x*.

$\frac{1}{2}$*g.*=$10\frac{1}{2}$*s.*

~~21~~	~~420~~ 20
x	2
	40 weeks. *Ans.*

(35)

12*doz.* : 297 : : \$54,72 : *x*.

~~144~~	~~54,72~~ 38
x	297
	\$112,86. *Ans.*

(36)

9000 : 13500 : : \$3618 : *x*.

~~9000~~	~~13500~~ 27
x	~~3618~~ 201
	\$5427. *Ans.*

(37)

60 : 80 : : 1*hhd.* : *x*.

~~60~~	~~63~~ 21
x	~~80~~ 4
	84 mixture.

84—63=21 gallons of water.

(38)

$1 : $3570 : : ,60 : x.
$1 : $1875 : : ,60 : x.

1	3570	1	1875
x	,60	x	,60
	$2142 A.		$1125 B.

(39)

$3726 : $1 : : $2328,75.

46 | $3726 | $2328,75 | 28,75
x | 1
46 | 28,75

,62½. *Ans.*

(40)

3*mo.* : 1*wk.* : : 80 bottles : x.

3 | 1 | 80 | 20
x
3 | 20

6⅔ bottles. *Ans.*

(41)

4⅝*yd.* : 40⅘*yd.* : : 14*s.* 8*d.* : x.

3 | 5 | 44 | 4
x | 204 | 68
7
15 | 1904

126 1/15 shil. *Ans*

(42)

14¾*oz.* : 154⅞*lb.* : : 1*lb.* : x.

56	2488	42
x	4	
	168 pounds. *Ans.*	

(43)

1*gal.* : 100*gal.* : : ½*pt.* : x.

2	100	
x	1	
	50 pts. short = 6¼*gal.*	

100 − 6¼ = 93¾*gal.* *Ans.*

(44)

23 − 19 = 4 miles gain.
4 : 96 : : 23 : x.

4 | 23 | 24
x | 96
552*mi.* *Ans.*

(45)

¾ of 5/7 = 15/28.
15/28 : 1 : : $9345 : x.

	9345	623
	1	
15	28	
	$17444. *Ans.*	

(46)

$11 : 6 :: 12 : x.$

11	12
x	6
11	72

$6hr.\ 32m.\ 43\frac{7}{11}sec.$ *Ans.*

(47)

$7 : 196 :: 5 : x.$

7	196
x	5
	140 feet. *Ans.*

(48)

4+5=9 miles, the distance they approach each other in 1 hour.

$9mi. : 279mi. :: 1hr. : x.$

9	279
x	1
	31 *hrs.*, time before they meet.

5×31=155 miles A travelled.
4×31=124 miles B travelled.

(49)

$\frac{1}{3}+\frac{1}{4}+\frac{1}{6}=\frac{9}{12}$, what all will do in 1 day.

$9 : 12 :: 1 : x.$

9	12
x	1
9	12

$1\frac{1}{3}$ days. *Ans.*

(50)

$\frac{1}{6}-\frac{1}{15}=\frac{2}{45}$, what C can do alone in 1 day.

$2 : 45 :: 1 : x.$

2	45
x	1
2	45

$22\frac{1}{2}$ days. *Ans.*

(51)

$8+7=15$, the whole number of hands at work; A is to receive pay for 8, and B for 7, therefore A must have $\frac{8}{15}$, and B $\frac{7}{15}$ of the \$165,75.

15 : 8 : : 165,75 : x=\$88,40 A's.
15 : 7 : : 165,75 : x=\$77,35 B's.

(52)

From 12 o'clock Monday to 10*hr.* 15*m.* on Saturday is 4*da.* 22*hr.* 15*m.*

1*da.* : 4*da.* 22*hr.* 15*m.* : : 3*m.* 10*sec.* : x=15*m.* $36\frac{7}{48}$*sec.* gain, to which add the 10 minutes =25*m.* $36\frac{7}{48}$*sec.*;

10*hr.*	15*m.*	
	25*m.*	$36\frac{7}{48}$*sec.*
10*hr.*	40*m.*	$36\frac{7}{48}$*sec.* *Ans.*

(53)

10*m.*+$7\frac{1}{2}$*m.*=$17\frac{1}{2}$*m.* difference in 24 hours. Time from Tuesday 12 o'clock to Friday morning 6 o'clock, is 2*da.* 18*hr.*

24*hr.* : 2*da.* 18*hr.* : : $17\frac{1}{2}$*m.* : x=48*m.* $7\frac{1}{2}$*sec.* *Ans.*

(54)

6 boys =3 men.

15 : 8 : : \$46,25 : x.

3	15 | 46,25	9.25
	x | 8	
	3 | 74,00	

x=\$24,66$\frac{2}{3}$. *Ans.*

(55)

B travels $11\frac{1}{3}$ yards per minute, and gains upon A $\frac{1}{3}$ of a yard; $536\div 2=268$ yards, the whole distance to be gained.

$\frac{1}{3}$: 268 : : 11 : x=8844 yards that B must travel to overtake A; $8844\div 536=16\frac{1}{2}$ times that he must travel around *the wood*,

INVERSE PROPORTION.

(1)

$$\left.\begin{matrix}3\frac{3}{4}\\1\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\\frac{5}{8}\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{4} & \cancel{15}\ 3 \\ \cancel{2} & 3 \\ \cancel{5} & \cancel{8} \\ x & \end{array}$$

$x=9$ yards. *Ans.*

(2)

$$\left.\begin{matrix}16\frac{4}{5}\\3\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\7\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{2} & 7 \\ 5 & \cancel{84}\ 6 \\ \cancel{7} & \\ x & \\ \hline 5 & 42 \end{array}$$

$x=8\frac{2}{5}$ rods. *Ans.*

(3)

$$\left.\begin{matrix}36\,ft.=12yd.\ 12\\30\,ft.=10yd.\ 10\end{matrix}\right\} : \left.\begin{matrix}x\\\frac{3}{4}\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} & \cancel{12}\ 4 \\ \cancel{3} & 10 \\ x & 4 \end{array}$$

$x=160$ yards. *Ans.*

(4)

$$\left.\begin{matrix}8\\9\end{matrix}\right\} : \left.\begin{matrix}x\\10\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} 5\ \cancel{10} & \cancel{8}\ 4 \\ x & 9 \\ \hline 5 & 36 \end{array}$$

$x=7\frac{1}{5}$ days. *Ans.*

(5)

$$\left.\begin{matrix}15\\8\end{matrix}\right\} : \left.\begin{matrix}x\\24\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{24} & \cancel{15}\ 5 \\ x & \cancel{8} \end{array}$$

$x=5$

$15-5=10.$ *Ans.*

(6)

$$\left.\begin{matrix}4600\\6\end{matrix}\right\} : \left.\begin{matrix}x\\30\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{30} & \cancel{4600}\ 920 \\ x & \cancel{6} \end{array}$$

$x=920.$ *Ans.*

(7)

$$\left.\begin{matrix}9000\\90\end{matrix}\right\} : \left.\begin{matrix}15000\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{15000} & \cancel{9000}\ 6 \\ x & \cancel{90} \end{array}$$

$x=54$ days. *Ans.*

(8)

$$\left.\begin{matrix}7\frac{1}{2}\\330\end{matrix}\right\} : \left.\begin{matrix}11\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{2} & 15 \\ \cancel{11} & \cancel{330}\ 15 \\ x & \end{array}$$

$x=225$ days. *Ans.*

(9)

$(4000 \times 14) \div 16 = 3500$*lbs.*, amount of bread consumed in 1 day; $3500 \times 168 = 588000$ pounds, amount consumed in 24 weeks; $210 \times 200 = 42000$ pounds, the amount spoiled; $588000 - 42000 = 546000$ pounds remained.

$$588000 : 546000 :: 14oz. : x = 13oz. \quad \textit{Ans.}$$

(10)

$13oz. : 14oz. :: 546000lb. : x = 588000lb.$ weight of the whole.
$14oz. : 13oz. :: 588000lb. : x = 546000lb.$ received.

(11)

$13oz.$ to each man per day $= 546000lb. = \frac{13}{14}$ of the whole.

$$13 : 14 :: 546000 : x = 588000lb.$$
$$546000 : 588000 :: 13 : x = 14oz.$$

(12)

$$\left.\begin{matrix}4\\80\end{matrix}\right\} : \left.\begin{matrix}16\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{16} & 4 \\ x & \cancel{80}\ 5 \end{array}$$

$x = 20$ days. *Ans.*

(13)

$$\left.\begin{matrix}21\\18\end{matrix}\right\} : \left.\begin{matrix}7\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{7} & \cancel{21}\ 3 \\ x & 18 \end{array}$$

$x = 54$ days. *Ans.*

(14)

$$\left.\begin{matrix}20\\6\end{matrix}\right\} : \left.\begin{matrix}10\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{10} & \cancel{20}\ 2 \\ x & 6 \end{array}$$

$x = 12$ days. *Ans.*

(15)

$$\left.\begin{matrix}10\\12\end{matrix}\right\} : \left.\begin{matrix}20\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{20} & \cancel{10}\ 6 \\ x & \cancel{12} \end{array}$$

$x = 6$ days. *Ans.*

(16)

$$\left.\begin{matrix}100\\120\end{matrix}\right\} : \left.\begin{matrix}75\\x\end{matrix}\right\} :: 90 : 90.$$

$$\begin{array}{r|l} \cancel{90} & \cancel{100}\ 4 \\ \cancel{75} & \cancel{120}\ 40 \\ x & \cancel{90} \\ \hline \end{array}$$

$x=160$ days. *Ans.*

(17)

$$\left.\begin{matrix}35{,}5\\13{,}566\end{matrix}\right\} : \left.\begin{matrix}x\\11{,}9\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{11.9} & 35.5\ 1{,}14 \\ x & \cancel{13.566} \\ \hline \end{array}$$

$x=40.47$ days. *Ans.*

(18)

$$\left.\begin{matrix}50\\12\end{matrix}\right\} : \left.\begin{matrix}5\\x\end{matrix}\right\} :: 600 : 600.$$

$$\begin{array}{r|l} \cancel{600} & \cancel{600} \\ \cancel{5} & \cancel{50} \\ x & 12 \\ \hline \end{array}$$

$x=120$ months. *Ans.*

(19)

$$\left.\begin{matrix}12\\4\end{matrix}\right\} : \left.\begin{matrix}x\\9\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} 3\ \cancel{9} & \cancel{12}\ 4 \\ x & 4 \\ \hline 3x & 16 \\ \hline \end{array}$$

$x=5\frac{1}{3}$ days. *Ans.*

(20)

$$\left.\begin{matrix}120\\15\frac{1}{4}\end{matrix}\right\} : \left.\begin{matrix}x\\40\frac{2}{3}\end{matrix}\right\} :: \tfrac{1}{2} : \tfrac{1}{2}.$$

$$\begin{array}{r|l} 6\ \cancel{4} & \cancel{120}\ 15 \\ \cancel{122} & \cancel{61} \\ \cancel{2} & 3 \\ x & \cancel{2} \\ \hline \end{array}$$

$x=45$ men. *Ans.*

(21)

$$\left.\begin{matrix}3600\\34\\24\end{matrix}\right\} : \left.\begin{matrix}4800\\45\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} 5\ \cancel{4800} & \cancel{3600} \\ \cancel{45} & 34\ 2 \\ x & \cancel{24} \\ \hline 5 & 68 \\ \hline \end{array}$$

$x=13\frac{3}{5}$ oz. *Ans.*

(22)

1 horse $=1\frac{2}{3}$ colts; 7 horses and 3 colts $=8\frac{4}{5}$ horses.

$$\left.\begin{matrix}3\\40\end{matrix}\right\} : \left.\begin{matrix}8\frac{4}{5}\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} 11\ \cancel{44} & \cancel{40}\ 10 \\ x & \cancel{3} \\ \hline 11 & 150 \\ \hline \end{array}$$

$x=13\frac{7}{11}$ days. *Ans.*

(23)

$$\left.\begin{matrix}24\\10\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\12\frac{1}{4}\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} {}^{7}\cancel{40} & \cancel{4}\,{}^{2} \\ x & 24 \\ \cancel{2} & \cancel{21}\,{}^{3} \\ \hline 7 & 144 \end{array}$$

$x=20\frac{4}{7}$ days. *A.*

(24)

$$\left.\begin{matrix}40\\4\end{matrix}\right\} : \left.\begin{matrix}x\\15\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} {}^{3}\cancel{15} & \cancel{40}\,{}^{8} \\ x & 4 \\ \hline 3 & 32 \end{array}$$

$x=10\frac{2}{3}$ rods. *Ans.*

(25)

$$\left.\begin{matrix}12\\10\end{matrix}\right\} : \left.\begin{matrix}x\\9\end{matrix}\right\} :: \tfrac{1}{2} : \tfrac{1}{2}.$$

$$\begin{array}{r|l} {}^{3}\cancel{9} & \cancel{12}\,{}^{4} \\ x & 10 \\ \cancel{2} & \cancel{2} \\ \hline 3 & 40 \end{array}$$

$x=13\frac{1}{3}$ days. *Ans.*

(26)

$$\left.\begin{matrix}100\\4\frac{1}{2}\\36\end{matrix}\right\} : \left.\begin{matrix}100\\x\\20\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{100} & \cancel{100} \\ 2 & 9 \\ x & \cancel{36}\,{}^{9} \\ {}^{5}\cancel{20} & \\ \hline 10 & 81 \end{array}$$

$x=8\frac{1}{10}$ *cwt.* *Ans.*

(27)

$$\left.\begin{matrix}20\\12\\9\end{matrix}\right\} : \left.\begin{matrix}x\\6\\10\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{10} & \cancel{20}\,{}^{4} \\ \cancel{6} & \cancel{12} \\ x & 9 \end{array}$$

$x=36$ men. *Ans.*

(28)

$$\left.\begin{matrix}72\\7\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\90\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{90} & \cancel{72}\,{}^{6} \\ x & \cancel{15} \\ \cancel{2} & \end{array}$$

$x=6$ horses. *Ans.*

(29)

$$\left.\begin{matrix}5000\\15\\2\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\12\frac{1}{2}\\1\frac{3}{4}\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} & \cancel{5000}\,{}^{100} \\ & 15 \\ \cancel{2} & \cancel{5} \\ \cancel{25} & \cancel{2} \\ 7 & 4 \\ \hline 7 & 6000 \end{array}$$

$x=8571\frac{3}{4}$ planks. *Ans.*

(30)

$$\left.\begin{matrix}12\\18\\3\end{matrix}\right\} : \left.\begin{matrix}9\\24\\x\end{matrix}\right\} :: 1 : 1.$$

$$\begin{array}{r|l} \cancel{9} & \cancel{12} \\ \cancel{24} & \cancel{18} \\ x & 3 \end{array}$$

$x=3$ hours. *Ans.*

COMPOUND PROPORTION.

(1)

$$\left.\begin{matrix}2\\75\end{matrix}\right\} : \left.\begin{matrix}18\\x\end{matrix}\right\} :: 125 : 243.$$

$$\begin{array}{r|l} {}^{5}\cancel{125} & \cancel{243}^{81} \\ \cancel{18} & \cancel{75} \\ x & \cancel{2} \\ \hline 5 & 81 \end{array}$$

$x = 16\frac{1}{5}$ days. *Ans.*

(2)

$$\left.\begin{matrix}400\\12\end{matrix}\right\} : \left.\begin{matrix}x\\2\end{matrix}\right\} :: 5 : 15.$$

$$\begin{array}{r|l} \cancel{5} & 400 \\ \cancel{2} & \cancel{15}^{3} \\ x & \cancel{12}^{6} \\ \hline \end{array}$$

$x = 7200$ men. *A.*

(3)

$$\left.\begin{matrix}12\\8\end{matrix}\right\} : \left.\begin{matrix}15\\10\end{matrix}\right\} :: 120 : x.$$

$$\begin{array}{r|l} {}^{2}\cancel{12} & \cancel{120}^{5} \\ \cancel{8} & 15 \\ x & \cancel{10}^{5} \\ \hline 2 & 375 \end{array}$$

$x = 187\frac{1}{2}$ miles. *Ans.*

(4)

$$\left.\begin{matrix}6\\4\end{matrix}\right\} : \left.\begin{matrix}12\\9\end{matrix}\right\} :: 16 : x.$$

$$\begin{array}{r|l} \cancel{6} & \cancel{16}^{8} \\ \cancel{4} & \cancel{12} \\ x & 9 \\ \hline \end{array}$$

$x = 72$ acres. *Ans.*

(5)

$$\left.\begin{matrix}24\\40\end{matrix}\right\} : \left.\begin{matrix}48\\x\end{matrix}\right\} :: 60 : 30.$$

$$\begin{array}{r|l} \cancel{60} & \cancel{40}^{10} \\ \cancel{48} & \cancel{30} \\ x & \cancel{24} \\ \hline \end{array}$$

$x = 10$ days. *A.*

(6)

$$\left.\begin{matrix}82\\4\end{matrix}\right\} : \left.\begin{matrix}48\\x\end{matrix}\right\} :: \begin{matrix}36\\8\\4\end{matrix} : \begin{matrix}864\\6\\3\end{matrix}$$

$$\begin{array}{r|l} {}^{4}\cancel{36} & \cancel{864}^{3} \\ \cancel{8} & \cancel{6} \\ \cancel{4} & 3 \\ \cancel{48} & \cancel{82}^{41} \\ x & \cancel{4} \\ \hline 4 & 369 \end{array}$$

$x = 92\frac{1}{4}$ days. *Ans.*

(7)

$$\left.\begin{matrix}80\\3\frac{1}{2}\\150\end{matrix}\right\} : \left.\begin{matrix}30\\12\\50\end{matrix}\right\} :: 84 : x.$$

$$\begin{array}{r|l} \$\emptyset & \$\emptyset \\ 1\$\emptyset & 1\not 2 \\ x & 5\emptyset \\ 7 & \$4 \\ & \not 2 \end{array} \quad \begin{matrix} 3 \\ \\ \\ 12 \\ \\ \end{matrix}$$

$x = \$36$. *Ans.*

(8)

$$\left.\begin{matrix}6\\1\end{matrix}\right\} : \left.\begin{matrix}9\\12.5\end{matrix}\right\} :: 15.6 : x.$$

$$\begin{array}{r|l} \not\$ & 1\not 5.\not 6 \\ 1 & 12.5 \\ x & 9 \end{array} \quad 2.6$$

$x = 312.5$ gallons.

(9)

$$\left.\begin{matrix}12\\7\end{matrix}\right\} : \left.\begin{matrix}x\\19\end{matrix}\right\} :: 14 : 494.$$

$$\begin{array}{r|l} 1\not 9 & 4\not 94 \\ 1\not 4 & 1\not 2 \\ x & 7 \end{array} \quad \begin{matrix} 16 \\ 6 \\ \\ \end{matrix}$$

$x = 96$ tailors. *Ans.*

(10)

$$\left.\begin{matrix}3600\\35\\24\end{matrix}\right\} : \left.\begin{matrix}x\\45\\14\end{matrix}\right\} :: 1 ; 2.$$

$$\begin{array}{r|l} 4\not 5 & \$\not\emptyset\not\emptyset\not\emptyset \\ 1\not 4 & \$\not 5 \\ 1 & 24 \\ x & \not 2 \end{array} \quad 400$$

$x = 9600$ men. *A.*

(11)

$$\left.\begin{matrix}100\\2s.\,6d.\end{matrix}\right\} : \left.\begin{matrix}x\\1s.\,9d.\end{matrix}\right\} :: £20 : £7.$$

$$\begin{array}{r|l} 4\not\$\not\emptyset\not\emptyset & 1\not\emptyset\not\emptyset \\ \not 2 1 & \$\not\emptyset \\ x & 1\not\$\not\$\emptyset \end{array} \quad \begin{matrix} 10 \\ 5 \\ \\ \end{matrix}$$

$x = 50$ men. *Ans.*

(12)

$$\left.\begin{matrix}13\\7\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}20\\15\frac{1}{3}\end{matrix}\right\} :: \$149{,}76 : x.$$

$$\begin{array}{r|l} 1\not 3 & 1\not 4\not 9{,}7\not\$ \\ 1\not 5 & 2 \\ x & \not 2\emptyset \\ \not 3 & 46 \end{array} \quad \begin{matrix} 1.28 \\ \\ 4 \\ \\ \end{matrix}$$

$x = \$471{,}04$. *Ans.*

(13)

$$\left.\begin{matrix}6\frac{3}{5}\\12\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\10\frac{2}{7}\end{matrix}\right\} :: 264 : 129\tfrac{3}{5}.$$

$$\begin{array}{r|l} 2\not\$4 & 7 \\ 72 & \not\$4\not 8 \\ \not 5 & 2\not 5 \\ 2 & \not 3\not 3 \\ \not 5 & \end{array} \quad \begin{matrix} 8 \\ \\ 9 \\ \\ \\ \end{matrix}$$

$16 / 63$

$x = 31\frac{5}{16}$ days. *Ans.*

(14)

$$\left.\begin{matrix}120\\3\\12\end{matrix}\right\} \left.\begin{matrix}x\\9\\15\end{matrix}\right\} \left.\begin{matrix}30yd.\\::\ 2ft.\\4ft.\end{matrix}\right\} \left.\begin{matrix}50yd.\\:\ 6ft.\\4\frac{1}{2}ft.\end{matrix}\right\}$$

$$\begin{array}{r|l} \$\emptyset & 1\not 2\emptyset \\ \not 2 & \not 3 \\ \not 4 & 1\not 2 \\ x & 5\emptyset \\ \not 9 & 6 \\ 1\not 5 & \not 9 \\ \not 2 & \end{array} \quad \begin{matrix} \\ \\ \\ 10 \\ \\ 3 \\ \\ \end{matrix}$$

$x = 180$. Ans.

(15)

$$\left.\begin{matrix}40\\12\end{matrix}\right\} : \left\{\begin{matrix}x\\2\frac{2}{5}\end{matrix}\right. : : 1 : 3.$$

12	5
1	40
x	12
	3

$x = 600$ men. *Ans.*

(16)

$$\left.\begin{matrix}8\\12\end{matrix}\right\} : \left\{\begin{matrix}x\\10\end{matrix}\right. : : 200 : 300.$$

5	200	300 3
	10	12 3
	x	8
	5	72

$x = 14\frac{2}{5}$ days. *Ans.*

(17)

$$\left.\begin{matrix}1000\\28\\18\end{matrix}\right\} : \left\{\begin{matrix}1600\\42\\x\end{matrix}\right. : : 1 : 1.$$

4	1000	1000 10
	42	28 3
	x	18
	4	30

$x = 7\frac{1}{2}$ ounces. *Ans.*

(18)

$$\left.\begin{matrix}5\ ft.\\2\frac{1}{2}in.\\1\frac{3}{4}in.\end{matrix}\right\} : \left\{\begin{matrix}7\ ft.\\3\ in.\\2\frac{1}{4}in.\end{matrix}\right. : : 45lb. : x.$$

	60	84
	5	2
	7	4 9
	x	45
		3
	4	9
	5	486

$x = 97\frac{1}{5}$ pounds. *A.*

(19)

$$\left.\begin{matrix}5\\16\\14\end{matrix}\right\} : \left\{\begin{matrix}10\\x\\7\end{matrix}\right. : : \left\{\begin{matrix}20\\24\\50\\40\end{matrix}\right. : \left\{\begin{matrix}40\\16\\60\\50\end{matrix}\right.$$

	20	40
	24	16 2
	50	60
	40	50
	10	5
	7	16
	x	14

$x = 32$ days. *Ans.*

(20)

$$\left.\begin{matrix}12\\6\end{matrix}\right\} : \left\{\begin{matrix}x\\4\end{matrix}\right. : : 18000 : 32000.$$

	18000	32000 8
		12 4
	4	6
	x	

32 horses. *A.*

(21)

$$\left.\begin{matrix}3\\15\\10\end{matrix}\right\}:\left\{\begin{matrix}x\\4\\12\end{matrix}\right\}::\begin{matrix}150\\240\end{matrix}:\begin{matrix}192\\300\end{matrix}$$

150	300
240	192
12	10
4	5
x	8

$x=5$ men. *Ans.*

(22)

$$\left.\begin{matrix}248\\5\frac{1}{2}\\11\\7\end{matrix}\right\}:\left\{\begin{matrix}24\\x\\9\\4\end{matrix}\right\}::\left\{\begin{matrix}7\\232\frac{1}{2}\\3\frac{2}{3}\\2\frac{1}{3}\end{matrix}\right\}:\left\{\begin{matrix}4\\337\frac{1}{2}\\5\frac{3}{5}\\3\frac{1}{2}\end{matrix}\right\}$$

7	2
465	3
11	3
7	248
24	11
9	11
2	4
	3
	675
	4
2	28
5	7
2	

132 days. *A.*

PARTNERSHIP.

(1)

7500 : 2500 : : 3000 : x = \$1000 A's.
7500 : 3000 : : 3000 : x = \$1200 B's.
7500 : 2000 : : 3000 : x = \$ 800 C's.

(2)

4200 : 3600 : : 2000 : x = \$1714,285$\frac{5}{7}$ A's.
4200 : 600 : : 2000 : x = \$ 285,714$\frac{2}{7}$ B's.

(3)

40000 : 10000 : : 15920 : x = \$3980 ; 3980 + 50 = \$4030 A's.
40000 : 10000 : : 15920 : x = \$ 3980 B's.
40000 : 10000 : : 15920 : x = \$ 3980 C's.
40000 : 10000 : : 15920 : x = \$3980 ; 3980 + 30 = \$4010 D's.

(4)

A B C D E

$\frac{1}{4}, \frac{1}{6}, \frac{1}{6}, \frac{1}{8}, \frac{1}{3} = \frac{6}{24}, \frac{3}{24}, \frac{4}{24}, \frac{3}{24}, \frac{8}{24}$.

24 : 6 : 20000 : x = \$5000 A's.
24 : 3 : 20000 : x = \$2500 B's.
24 : 4 : 20000 : x = \$3333,33$\frac{1}{3}$ C's.
24 : 3 : 20000 : x = \$2500 D's.
24 : 8 : 20000 : x = \$6666,66$\frac{2}{3}$ E's.

(5)

2200 : 500 : : 440 : x = 100 A's.
2200 : 700 : : 440 : x = 140 B's.
2200 : 1000 : : 440 : x = 200 C's.

(6)

18000 : 5000 : : 12000 : x = \$3333,33$\frac{1}{3}$ First.
18000 : 4500 : : 12000 : x = \$3000 Second.
18000 : 4500 : : 12000 : x = \$3000 Third.
18000 : 4000 : : 12000 : x = \$2666,66$\frac{2}{3}$ Fourth.

(7)

As each son was to have but one half as much as the mother, so the surviving son will have but one part, while the mother will have two parts of the legacy, or the son will have $\frac{1}{3}$ and the mother $\frac{2}{3}$ of \$4500.

3 : 1 : 4500 : x = \$1500 the son's share.
3 : 2 : 4500 : x = \$3000 the mother's share.

(8)

A, B and C's shares of the gain is $\frac{13167}{15000}=\frac{4389}{5000}$ of the whole gain ; therefore, D's share of the gain is $\frac{611}{5000}$ of the whole gain ; and, as his capital will be the same part of the whole capital as his gain is of the whole gain, \$5499 must be $\frac{611}{5000}$ of the whole capital or stock, which will give \$45000 for the whole stock; and as the whole gain is to each man's gain as the whole stock is to each man's stock, therefore,

15000 : 4320,50 : : 45000 : x=\$12961,50 A's stock.
15000 : 5245,75 : : 45000 : x=\$15737,25 B's stock.
15000 : 3600,75 : : 45000 : x=\$10802,25 C's stock.

\$15000—13167=\$1833 D's gain.

(9)

A owned $\frac{3}{12}$, B $\frac{4}{12}$, and C $\frac{5}{12}$ of the mill; 4300—2500= \$1800 the whole loss.

12 : 3 : 1800 : x=450 A's loss.
12 : 4 : 1800 : x=600 B's loss.
12 : 5 : 1800 : x=750 C's loss.

(10)

5+7+8=20 ; then A must have $\frac{5}{20}$, B $\frac{7}{20}$, and C $\frac{8}{20}$ of \$16970.

20 : 5 : 16970 : x=\$4242,50 A's stock.
20 : 7 : 16970 : x=\$5939,50 B's stock.
20 : 8 : 16970 : x=\$6788 C's stock.

C's stock, \$6788, is equal to the whole gain, and each must have the same part of the whole gain as of the whole stock.

20 : 5 : : 6788 : x=\$1697 A's gain.
20 : 7 : : 6788 : x=\$2375,80 B's gain.
20 : 8 : : 6788 : x=\$2715,20 C's gain.

(11)

475,50+362,125+250,875+140=$1228,50.

1228,50 : 475,50 : : 614,25 : x=$237,75 A's.
1228,50 : 362,125 : : 614,25 : x=$181,0625 B's.
1228,50 : 250,875 : : 614,25 : x=$125,4375 C's.
1228,50 : 140 : : 614,25 : x=$ 70, D's.

(12)

,20 : $1 : : 2544 : x=$12720. *Ans.*

(13)

$\frac{3}{5}$, $\frac{4}{9}$, $\frac{1}{3}$, $\frac{7}{15}=\frac{27}{45}$, $\frac{20}{45}$, $\frac{15}{45}$, $\frac{21}{45}$, which added, gives $\frac{83}{45}$.

Then the four persons agreed to do 83 parts of the work, of which A would do 25, B 20, C 15, and D 21, and each must therefore receive like parts of the amount paid.

83 : 27 : : 270 : x=$87,831+ A's.
83 : 20 : : 270 : x=$65,060+ B's.
83 : 15 : : 270 : x=$48,795+ C's.
83 : 21 : : 270 : x=$68,313+ D's.

(14)

5+6+7=18, the proportional number of shares.

But since each share is taken twice, 18 denotes *twice* the number of shares ; hence, the number of shares is denoted by 9.

Now, the sum of the 1st and 2d shares is 5, that of the 1st and 3d, 6, and that of the 2d and 3d, 7 ; therefore, the second share is greater by 1 than the first, and the third, 1 greater than the second ; hence, the shares, taken in order, differ from each other by 1, and since the sum is 9 ; 2, 3, and 4 denote the respective shares.

9 : 2 : : 4569 : x=$1015,33$\frac{1}{3}$ the first.
9 : 3 : : 4569 : x=$1523, the second.
9 : 4 : : 4569 : x=$2030,66$\frac{2}{3}$ the third.

COMPOUND PARTNERSHIP.

(1)

$7\times3=21$
$9\times5=45$
$4\times6=24$
90

$90:21::70{,}20:x=\$16{,}38$ A's.
$90:45::70{,}20:x=\$35{,}10$ B's.
$90:24::70{,}20:x=\$18{,}72$ C's.

(2)

B received $\frac{21}{51}\frac{00}{00}=\frac{21}{51}$ of the whole gain, and A $\frac{30}{51}$; hence B put in $\frac{21}{51}$ of the whole stock, and A $\frac{30}{51}$. A's stock was in one year. $10000\times12=120000$; then \$120000 is $\frac{30}{51}$ of the whole stock, from which we find $\frac{21}{51}$ or B's share of the stock to be \$84000, which was in trade 8 months, and equivalent to 1500 barrels of flour; $84000\div8=10500$, B's capital, and equal to 1500 barrels of flour; $10500\div1500=\$7$ per barrel.

(3)

$23000\times\ 2=\ 46000$
$21200\times10=212000$
A's 258000

$13500\times4=54000$
$3500\times5=17500$
B's 71500
329500

$329500:258000::8400:x=\$6577{,}23\frac{43}{659}$ A's.
$329500:\ 71500::8400:x=\$1822{,}76\frac{116}{659}$ B's.

(4)

$4000\times12=48000$
$3000\times15=45000$
$5000\times\ 8=40000$
133000

$133000:48000::798:x=\$288$ A's.
$133000:45000::798:x=\$270$ B's.
$133000:40000::798:x=\$240$ C's.

(5)

If C's gain is $\frac{1}{12}$ and E's $\frac{6}{12}$ of the whole, then D's must be $\frac{5}{12}$ of the whole; then E's share of the gain is to D's, as E's stock for the time it was in trade, is to D's stock for the time it was in trade, and the same for C's; hence,

$\frac{6}{12} : \frac{5}{12} :: 756 \times 4 : x = 2520$; $2520 \div 9 = \$280$ D's stock.
$\frac{6}{12} : \frac{1}{12} :: 756 \times 4 ; x = 504$; $504 \div 3 = \$168$ C's stock.

(6)

$40 \times 4 \times 6 = 960$
$30 \times 12 \times 6 = 2160$
$22 \times 110 \times 5 = 12100$
15220

$15220 : 960 :: 20760 : x = \$ 1309,43\frac{377}{761}$ officers.
$15220 : 2160 :: 20760 : x = \$ 2946,22\frac{658}{761}$ midshipmen.
$15220 : 12100 :: 20760 : x = \$16504,33\frac{487}{761}$ sailors.

(7)

$3000 \times 9 = 27000$
$4000 \times 9 = 36000$
63000 A's.
$4000 \times 12 = 48000$
$4500 \times 3 = 13500$
$2500 \times 3 = 7500$
69000 B's.
$5500 \times 8 = 44000$ C's.
176000

$176000 : 63000 :: 7400 : x = \$2648,86\frac{4}{11}$ A's.
$176000 : 69000 :: 7400 : x = \$2901,13\frac{7}{11}$ B's.
$176000 : 44000 :: 7400 : x = \$1850,$ C's.

(8)

$14 \times 12 = 168$
$18 \times 10 = 180$
$15 \times 11 = 165$
$20 \times 9 = 180$
693

$693 : 168 :: 346,50 : x = \$84,$ A's.
$693 : 168 :: 346,50 : x = \$90,$ B's.
$693 : 168 :: 346,50 : x = \$82,50$ C's.
$693 : 180 :: 346,50 : x = \$90,$ D's.

(9)

$6 \times 4 = 24$ first grade $\quad 54 : 24 : : 27 : x = \$12$ 1st grade.
$12 \times 2 = 24$ second " $\quad 54 : 24 : : 27 : x = \$12$ 2d grade.
$6 \times 1 = 6$ third " $\quad 54 : 6 : : 27 : x = \$3$ 3d grade.
54

(10)

If \$600 accrue from \$480 in 6 months, the gain, \$120, would be equal to $\frac{1}{4}$ the stock, and in 12 months it would be twice as much, or $\frac{1}{2}$ the stock; therefore, \$1200, B's stock and gain for 12 months, is $\frac{3}{2}$ of his stock, from which we obtain \$800 for B's stock.

Then B's stock is to C's stock, as B's gain for 12 months is to C's gain for the same time, or

$800 : 320 : : 400 : x = \$160$ C's gain for 12 months.
$320 + 160 = \$480$ C's stock and profit.
$480 : 520 : : 12 : x = 13$ months, C's time.

PERCENTAGE.

(1)
.095 ; .0875. *Ans.*

(2)
.125; .09875. *Ans.*

(3)
2.08 ; 3.75 ; .95. *Ans.*

(4)
.6666⅔. *Ans.*

(2)
$1256 \times .0025 = \$3{,}14$. *Ans.*

(3)
$956{,}50 \times .005 = \$4{,}7825$. *Ans.*

(4)
$475 \times .0075 = 3.5625 yds.$ *A.*

(5)
$324.5 \times .00875 = 2.839375 cwt.$

(6)
$125.25 \times .008 = 1.002 lb.$ *Ans.*

(7)
$750 \times .016 = 12 bush.$ Ans.

(8)
$2000 \times .045 = \$90$. *Ans.*

(9)
$186 \times .09 = 16.74$ miles. *Ans.*

(10)
$460 \times .10375 = 47.725$ sheep.

(11)
$540 \times .051 = 27.54$ tons.

(12)
$3465.75 \times .086\frac{2}{3} = \$300.365$. *A.*

(13)
$126 \times .125 = 15.75$ cows.

(14)
$320 \times .50 = 160$ bales.

(15)
$1275 \times .375 = 478.125$ yards.

(16)
$4573 \times .95 = \$4344.35$. *Ans.*

(17)
$2500 \times 1.05 = 2625$ barrels.

(18)
$4537 \times 1.125 = \$5144.625$. *A.*

(19)
$5000 \times 2.50 = \$12500$. *A.*

(20)
$1267.875 \times 3.05 = \$3867.01875$. *Ans.*

(21)
$3000 \times 5.00 = \$15000$. *Ans.*

(22)
$1500 \times .075 = 112.50$
$1000 \times .0475 = 47.50$
$\$65.00$ *A.*

(23)
$895 \times .17 = 152.15$; $895 - 152.15 = 742.85$ gallons.

(24)
$250 \times .18 = 45.$; $250 - 45 = 205.$ boxes.

(25)
$.20 + .37\frac{1}{2} = .57\frac{1}{2}$; $1.00 - .57\frac{1}{2} = .42\frac{1}{2}$ = per cent in bonds and mortgages.

$25000 \times .42\frac{1}{2} = \$10625$, amount in bonds and mortgages.

(26)

$3250 \times .87\frac{1}{2} = \$2843.75$; $3250. + 2843.75 = \$6093.75$. *Ans.*

(27)

$.25 + .50 + .12\frac{1}{2} = .87\frac{1}{2}$; $1.00 - .87\frac{1}{2} = 12\frac{1}{2}$;
$1572.75 \times .12\frac{1}{2} = \$196.59375$. *Ans.*

(1) $2 \div 10 = .20$ *Ans.*

(2) $4 \div 32 = .125$. *Ans.*

(3) $3 \div 40 = .075$ *Ans.*

(4) $17 \div 125 = .136$. *Ans.*

(5) $36 \div 144 = .25$. *Ans.*

(6) $84 \div 96 = .875$. *Ans.*

(7) $275 \div 440 = .625$. *Ans.*

(8) $3 \div 400 = .0075$. *Ans.*

(9) $11 \div 800 = .01375$. *Ans.*

(10) $104 \div 312 = .33\frac{1}{3}$. *Ans.*

(11) $121.875 \div 325 = .375$. *Ans.*

(12)

$56.25 \div 450 = .125$. *Ans.*

(13)

$2500 \times .20 = \$500$ for groceries; $1875 + 500 = \$2375$;
$2500 - 2375 = \$125$ left; $125 \div 2500 = .05$. *Ans.*

(14)

$562.50 - 405 = \$157.50$: $157,50 \div 405 = .38\frac{8}{9}$. *Ans.*

(15)

$5400 + 1350 = \$6750$; $5400 - 540 = \$4860$; $4860 \div 6750$
$= .72$. *Ans.*

(1)

$248 \div 1.55 = \$160$; $160 \div 40 = \$4$ per head.

(2)

$6835.50 \div 1.26 = \$5425$. *Ans.*

(3)

$1 - .37\frac{1}{2} = .62\frac{1}{2}$; $31250 \div .625 = \$50000$. *Ans.*

(4)

$1 - .16 = .84$; $4200 \div .84 = \$5000$. *Ans.*

INTEREST.

(2)

$871{,}25 \times .07 = \$60{,}9875$. *A*

(3)

$535{,}50 \times .06 \times 7 = \$224{,}91$.

(4)

$1125{,}885 \times .08 \times 4 = \$360{,}2832$. *Ans.*

(5)

$789{,}74 \times .05 \times 12 = \$473{,}844$. *Ans.*

(6)

$2500 \times .075 \times 7 = \$1312{,}50$. *Ans.*

(7)

$3153{,}82 \times .045 \times 2 = \$283{,}8438$. *Ans.*

(8)

$199{,}48 \times .07 \times 16 = \$223{,}4176$; $199{,}48 + 223{,}4176$
$= \$422{,}8976$. Ans

(9)

$897{,}50 \times .08 \times 3 = \$215{,}40$; $897{,}50 + 215{,}40 = \$1112{,}90$. *A.*

(10)

$982{,}35 \times .0675 \times 4 = \$265{,}2345$. *Ans.*

(11)

$1500 \times .0525 \times 5 = \$393{,}75$; $1500 + 393{,}75 = \$1893{,}75$.

(12)

$1914{,}10 \times .0325 \times 6 = \$373{,}2495$. *Ans.*

(13)

$350 \times .10 \times 21 = \$735$. *Ans.*

(14)

$628{,}50 \times .12\frac{1}{2} \times 5 = \$287{,}575$; $628{,}50 + 287{,}575 = \$916{,}075$.

(15)

$75{,}50 \times .06 \times 10 = \$45{,}30$; $75{,}50 + 45{,}30 = \$120{,}80$. *Ans.*

(16)

$5040 \times .075 \times 2 = \$756$; $5040 + 756 = \$5796$. *Ans.*

(1)

$119{,}48 \times .07 \times 2\frac{1}{2} = \$20{,}909$. *Ans.*

(2)

$250{,}60 \times .06 \times 1\frac{3}{4} = \$26{,}313$. *Ans.*

(3)

$956 \times .09 \times 5\frac{1}{3} = \$458{,}88$. *Ans.*

(4)

$1575{,}20 \times .07 \times 3\frac{2}{3} = \$404{,}3013$; $1575 + 404{,}3013$
$= \$1979{,}5013$. *Ans.*

(5)

$5000 \times .055 \times 2\frac{1}{4} = \$618,75$; $5000 + 618,75 = \$5618,75$. *Ans.*

(6)

$1508,20 \times .10 \times 4\frac{1}{6} = \$628,416\frac{2}{3}$. *Ans.*

(7)

$75 \times .125 \times 6\frac{5}{6} = \$64,0625$. *Ans.*

(8)

$125 \times .0475 \times 5\frac{1}{2} = \$32,65625$; $125 + 32,65625 = \$157,65625$.

(2)

$\$358,50 \times .07 \div 12 = 2.09125$; $2.09125 \times 20.2 = \$42,243$. *A.*

(3)

$\$1461,75 \times .06 \div 12 = 7.30875$; $7.30875 \times 57.5 = \$420,253$. *A.*

(4)

$\$1200 \times .075 \div 12 = 7.5$; $7.5 + 28.4 = \$213$. *Ans.*

(5)

$\$4500 \times .05 \div 12 = \$18,75$; $18,75 \times 9.6\frac{2}{3} = \$181,25$. *Ans.*

(6)

$\$156,25 \times .08 \div 12 = \$1,4166+$; $1,4166 \times 10.6 = \$11,041$. *A.*

(7)

$\$640 \times .065 \div 12 = 3.4666+$; $3.4666 \times 38.3 = \$132,77$. *Ans.*

(8)

$\$276,5 \times .10 \div 12 = 2.30416+$; $2.30416 \times 11.7 = \$26,958$. A.

(9)

$\$378{,}42 \times .07 \div 12 = 2.20745$; $2.20745 \times 17.1 + 378{,}42 = \$416{,}167$. *Ans.*

(10)

$\$1250 \times .105 \div 12 = 10.9375$; $10.9375 \times 7.7 + 1250 = \$1334{,}218$. *Ans.*

(11)

$\$6500 \times .095 \div 12 = 51{,}4583$; $51{,}4583 \times 2.3\frac{1}{3} = \$120{,}069$. *A.*

(12)

$\$70{,}50 \times .0525 \div 12 = .3084375$; $.3084375 \times 130 = \$40{,}096$.

(13)

$\$45 \times .0675 \div 12 = .253125$; $.253125 \times 144.9 + 45 = \$81{,}677$.

(14)

$\$100 \times .04 \div 12 = .3333+$; $.3333 \times 186 + 100 = \$161{,}993$. *A.*

(15)

$\$475{,}50 \times .08 \div 12 = 3{,}17$; $3{,}17 \times 69.8 = \$221{,}266$. *Ans.*

(16)

$\$4560 \times .07 \div 12 = 26.60$; $26{,}60 \times 14.6\frac{1}{3} = \$389{,}246$. *Ans.*

(17)

$\$128{,}375 \times .06 \div 12 = .641875$; $.641875 \times 10.9 + 128{,}375 = 135{,}371$. *Ans.*

(18)

$\$264{,}52 \times .06 \div 12 = 1.3226$; $1.3226 \times 32.4\frac{2}{3} = \$42{,}940$. *Ans.*

(19)

$\$76{,}50 \times .06 \div 12 = .3825$; $.3825 \times 21.4 + 76{,}50 = 84{,}885$. A.

(20)

$241,60 \times .07 \div 12 = 1.40933+$; $1.40933 \times 39.5 = \$55,668$. *A.*

(21)

$\$5600 \times .07 \div 12 = \$32,666+$. *Ans.*

(22)

$\$8450 \times .10 \div 12 = 70,416+$; $70,416 \times 2 + 8450 = \$8590.832$.

(23)

$\$4000 \times .09 \div 12 = 30$; $30 \times 1.2 = \$36$. *Ans.*

(24)

1853	10	10
1852	9	9
Time	1*yr.*	1*mo.* 1*da.*

$\$87,60 \times .065 \div 12 = .4745$; $4745 \times 13.0\frac{1}{3} + 87,60 = \$93,784$.

(25)

1858	4	25
1854	7	8
	3*yr.*	9*mo.* 17*da.*

$\$126,75 \times .07 \div 12 = .739375$; $.739375 \times 45.5\frac{2}{3} + 126,75 = 160,44$. *Ans.*

(26)

1856	9	15
1856	1	1
	8*mo.*	14*da.*

$\$350 \times .0525 \div 12 = 1.53125$; $1.53125 \times 8.4\frac{2}{3} = \$12.964$. *Ans.*

(27)

1856	12	1
1855	3	14
	1*yr.*	8*mo.* 17*da.*

$\$560,40 \times .10 \div 12 = 4,67$; $4,67 \times 17.5\frac{1}{2} = \$82,036$. Ans.

(28)

$1256 × .06 ÷ 12 = 6.2 ; 6.28 × 11.3 = $70.964. *Ans.*

(29)

1854	5	10
1850	10	5
3*yr.*	7*mo.*	5*da.*

$745,40 × .05 ÷ 12 = 3,1058 ; 3,1058 × 43.1⅔ + 745,40
= $879,467. *Ans.*

(30)

1st. Time 1*yr.* 3*mo.* 21*da.* 2d. 9*mo.* 26*da.*

$250 × .07 ÷ 12 = 1,458 ; 1,458 × 15,7 + 250 = $272,840 :
$500 × .07 ÷ 12 = 2,916 ; 2,916 × 9.8⅔ + 500 = $528,771 ;
$272,840 + $528,771 = $800,661. *Ans.*

(31)

From January 1st to September 1st = 8*mo.*
" March 15th " = 5*mo.* 16*da.*
" April 20th " = 4*mo.* 11*da.*
" June 3d " = 1*mo.* 28*da.*

Amount of $254 for 8*mo.* = $264.16
" $154,60 " 5*mo.* 16*da.* = $158.8772+
" $424,25 " 4*mo.* 11*da.* = $433.5127+
" $ 75,50 " 1*mo.* 28*da.* = $ 76.2278+
$932.7778. *Ans.*

(32)

$475,75 × .07 ÷ 12 = 2,7752 ; 2,7752 × 8.5 = $499,339. *Ans.*

(33)

$127,28 × .06 ÷ 12 = .6364 ; .6364 × 21 + 127.68 = 140.644. A.

(34)

At the end of the first year $1500 must be paid, and the interest on $4500, equal to - - - - $1792,50
At the end of the second year $1500, and interest on $3000 - - - - - =$1695,00
At the end of the third year $1500, and interest on $1500 - - - - - =$1597,50
Amount, $5085,00. *A.*

(35)

Interest on $40 for 8 months, - - - $1,86⅔
" " $40 " 7 " - - - 1,63⅓
" " $40 " 6 " - - - 1,40
" " $40 " 5 " - - - 1,16⅔
" " $40 " 4 " - - - ,93⅓
" " $40 " 3 " - - - ,70
" " $40 " 2 " - - - ,46⅔
" " $40 " 1 " - - - ,23⅓
Interest due at end of time, $8,43
Add principal due, 360,00
Amount due, $368,43
Interest on $368,43 for 1*yr.* 4*mo.* 15*da.*=$35,461;
$368,43+35,461=$403,891. *Ans.*

(36)

$9000÷3=$3000;
Amount of $3000 for 6*mo.* at 7½ per cent, =$3112,50
" " $3000 for 12*mo.* at 7½ " =$3225
$3000+$3112,50+$3225=$9337.50. *Ans.*

(1)

1856	6	10
1856	1	1
Time,	5mo.	9da.

$382,50×.07÷12=2.23125; 2.23125×53=$394.325. Ans.
7

(2)

1858	7	4
1856	3	1
Time,	2*yr.*	4*mo.* 3*da.*

$612 × .06 ÷ 12 = 3.06 ; 3.06 × 28.1 + 612 = $697.986. *Ans.*

(3)

Six months added to the date of the note would make it due January 3d, 1856. On interest, 1 year and 2 days.

$3120 × .07 ÷ 12 = 18,20 ; 18,20 × 12.0⅔ = $219.613. *Ans.*

(4)

1852	7	7
1851	12	3
Time,	7*mo.*	4*da.*

$786,50 × .08 ÷ 12 = 5,2433 ; 5,2433 × 7.1⅓ = $823,902. *Ans.*

(5)

This note was on interest 3 months.

$4560 × .07 ÷ 12 = 26.6042 ; 26,6042 × 3 + 4560
= $4640,532. *Ans*

(6)

This note is payable June 17th, 1857, and bears interest 1*yr.* 1*mo.* 4*da.*

$1854,83 × .06 ÷ 12 = 9,27415 ; 9,27415 × 13.1⅓ + 1854,83
= 1976,630. *Ans.*

(2)

£203.925 × .06 ÷ 12 = 1.019625 ; 1.019625 × 44.5⅓ = £45.4073
= £45 8*s.* 1¾*d.*

(3)

£215.6833 × .06 ÷ 12 = 1.078416 ; 1.078416 × 42.3
= *£45.6169968* = £45 12*s.* 4*d.* 2*far.* Ans.

(4)

£1543.525 × .04 ÷ 12 = 5.14508 ; 5.14508 × 30 = £154.3524
= £154 7*s.* 0*d.* 2*far.*

(5)

£1047.15 × .06 ÷ 12 = 5.2357 ; 5.2357 × 16.5 = £86.38905 ;
£86.38905 + £1047.15 = £1133,53905 = £1133 10*s.* 9¼*d.* + *A.*

(6)

£511. 1*s.* 4*d.* = £511.0666 + ; £511.0666 × .06 ÷ 12
× 78 = £199.3159 = £199 6*s.* 3*d.* 3*far.*

(7)

£161.7625 × .06 ÷ 12 = .8088125 ; .8088125 × 8.4⅓
= £6.82098541 = £6 16*s.* 5*d.*

(1)

x	
.06	12
9	178.9552

x = $3976.777 +. *Ans.*

(2)

x		
.07	~~12~~ 2	
~~30~~	~~76,965~~	15,393
.07	30.786	

x = $439.80. *Ans.*

(3)

x	
.06	12
21	2
	327.3249
1.26	7855.7976

x = $6234.831 +. *Ans.*

(4)

x	
.05	~~12~~
~~12~~	1500
.05	1500.00

x = $30000. *Ans.*

(5)

x		
.07	~~12~~ 4	
17 ~~51~~	283.3914	
1.19	1133.5656	

x = $952.5761 +. *Ans.*

(6)

35 ~~2100~~		
x	~~12~~	
9.4 ~~37.6~~	~~460.60~~	23.03
329	23.03	

x = .07. *Ans.*

(7)

2713	$42¢	
	x	12
	6	244.17
	2713	244.17

$x=.09$. *Ans.*

(8)

205.90	$470.¢¢	
	11 x	12
	22	452.¢¢ 226.49
	2264.490	226.4900

$x=.10$. *Ans.*

(9)

36	$4¢6	
	x	12
	31.8	$¢3.712 62.964
	1144.8	62.964

$x=.055$. *Ans.*

(10)

8	$¢¢¢¢	
	x	12
	12	7¢¢¢
	8	1.

$x=.12\frac{1}{2}$. *Ans.*

(11)

93.29	1119.4$	
	.07	12
	x	195.¢¢¢ 2798.7
	93.29	278.7

$x=30mo.=2yr.\ 6mo.$ *A.*

(12)

5	17$¢	
	.¢¢	12 6
	x	47.2$ 3
	5	18

$x=3.6mo.=3mo.\ 18da.$ *A.*

(13)

7850 − 7500 = $350, interest.

7$¢¢	4	
.¢3$	12	4
x	3$¢	

$x=16mo.=1yr.\ 4mo.$ *A.*

(14)

$¢¢		
.06	12	
x	$¢¢	
.06	12.00	

$x=200mo.=16yr.\ 8mo.$ *A.*

(15)

$5009.60 − $3720 = $1289.60

$72¢		
.065	12	
x	1289.6¢	4.16
.065	4.16	

$x=64mo.=5yr.\ 4mo.$ *Ans.*

(16)

Interest on $700 for 1*yr.* 8*mo* at 6 per cent, is $70; then how long will it take $750 to gain $70?

25	7$¢	
	.06	12 4
	x	7¢ 7
	1.50	28.00

$x=12mo.=1yr.$ Ans.

(2)

Principal on interest from Feb. 6th, 1850,	$6478.84	
Interest to Feb. 1st, 1856, (time 5*yr.* 11*mo.* 25*da.*) - - - - - -	2326.9833	
Amount,	$8805.8233	
Payment May 16, 1853, - $ 545.76		
" May 16, 1855, - $1276.		
" Feb. 1st, 1856, - $2074.72		
Their sum exceeds the interest then due,	$3896.48	
Remainder for a new principal, Feb. 1st, 1856, - - - - - - - -	$4909.3433	
Interest on $4909.3433 from Feb. 1st, 1856, to Aug.11, 1857,(1*yr.*6*mo.*10*da.*)	450.0231	
Amount due Aug. 11th, 1857, - -	$5359.3665.	*Ans.*

(3)

Principal on interest from Sept. 5, 1851,	$7851.04	
Interest to March 1, 1855, (3*yr.*5*mo.*26*da.*)	1643.4843	
Amount,	$9494.5243	
Payment Nov. 13th, 1853, $416.98		
" May 10th, 1854, $152.		
Their sum, - - - - - - -	$568.98	
Amount due March 1st, 1855, - -	$8925.5443.	*Ans.*

(4)

Principal on interest from Jan. 3d, 1854,	$8974.56
Interest to Feb.16th, 1855,(1*yr.*1*mo.*13*da.*)	703,256
Amount,	9677,816
Payment Feb. 16th, 1855, - - -	1875,40
Remainder for new principal, Feb.16. 1855,	$7802,416
Interest to Sept. 15, 1856, (1*yr.*6*mo.* 29*da.*)	863,249
Amount,	$8665,665

	8665,665	
Payment Sept. 15th, 1856, - - -	3841,26	
Remainder for new principal Sept. 15, 1856,	$4824,405	
Interest to Nov. 11th, 1857, (1*yr.* 1*mo.* 26*da.*)	390,240	
Amount,	$5214,646	
Payment Nov. 11th, 1857, - - -	1809,10	
Remainder for new principal, Nov. 11, 1857,	$3405.546	
Interest to June 9th, 1858, (6*mo.* 28*da.*) -	137,735	
Amount,	$3543,281	
Payment June 9th, 1858, - - -	2421,04	
Remainder for new principal, June 9, 1858,	$1122,241	
Interest to July 1st, 1858, (22*da.*) - -	4,800	
Amount due July 1st, 1855,	$1127,041.	*Ans.*

(5)

Principal on interest, from Nov. 1st, 1852, -		$345,50
Interest to June 20th, 1853, (7*mo.* 19*da.*) -		15,384
Amount, - -		$360,884
Payment June 20th, 1853, - - - -		75
Remainder for new principal, June 20th, 1853,		$285,884
Interest to Dec. 13th, 1856, (3*yr.* 5*mo.* 23*da.*,)		69,652
Amount. - -		$355,536
Payment Jan. 12th, 1854, -	$10,	
Payment March 3d, 1855, -	$15,50	
Payment Dec. 13th, 1856, -	$52,75	
Their sum, - - -		$78,25
Remainder for a new principal, Dec. 13th, 1856,		$277,286
Interest to October 14th, 1857, (10*mo.* 1*da.*,)		16,228
Amount, - - -		$293,514
Payment Oct. 14th, 1857, - - - -		106,75
Remainder for new principal, Oct. 14th, 1857, -		$186,764
Interest to Feb. 4th, 1858, (3*mo.* 20*da.*) -		3,994
Amount due Feb. 4th, 1858, - -		$190,758

(6)

Principal on interest, from Oct. 19th, 1850,	-	$450
Interest to Sept. 25th, 1851, (11*mo.* 6*da.*,)	-	33,60
Amount,	- -	$483,60
Payment September 25th, 1851,	- - -	85,60
Remainder for new principal Sept. 25th, 1851,		$398,00
Interest to June 6th, 1853, (1*yr.* 8*mo.* 11*da.*,)	-	54,039
Amount,	- -	$452,039
Payment July 10th, 1852, - $20		
Payment June 6th, 1853, - 150,45	-	
Their sum,	-	$170,45
Remainder for new principal June 6th, 1853,	-	$281,589
Interest to May 5th, 1855, (1*yr.* 10*mo.* 2*da.*)	-	43,114
Amount,	- -	$324,703
Payment Dec. 28th, 1854, - $25,125		
Payment May 5th, 1855, - $169	-	
Their sum,	-	$194,125
Remainder for new principal May 5th, 1855,	-	$130,578
Interest to October 18th, 1857, (2*yr.* 5*mo.* 13*da.*)		25,622
Amount due October 18th, 1857,	- - -	$156,200

COMPOUND INTEREST.

(2)

1.1449, amount of $1 for 2 years; $1.1449 \times \$175 = \$200,3575$, amount of $175 for 2 years; $\$200,3575 - \$175 = \$25,3575$, compound interest of $175 for 2 years.

(3)

$1.2155 \times 240 = \$291,72$ amount. *Ans.*

(4)

$1.19101 \times 300 = \$357,303$; $357,303 - 300 = \$57,303$. *Ans.*

(5)

$1.1236 \times 590{,}74 = \$663{,}755$; $663{,}755 - 590{,}74 = \$73{,}015$ compound interest. *Ans.*

(6)

$1.1664 \times 500 = \$583{,}20$; $583{,}20 - 500 = \$83{,}20$ comp. int. *Ans.*

(7)

$1.22504 \times 3758{,}56 = \$4604{,}386+$; $4604{,}386 - 3758{,}56 = \$845{,}826+$, *comp. int.* *Ans.*

(8)

$1.50363 \times 95637{,}50 = \$143803{,}414$; $143803{,}414 - 95637{,}50 = \$48165{,}91$ *comp. int.* *Ans.*

(9)

75439,75	principal for 1st year.
3394,7887	interest for 1st year.
78834,5387	principal for 2d year.
3547,5542	interest for 2d year.
82382,0929	principal for 3d year.
3707,1941	interest for 3d year.
86089,2871	principal for 4th year.
3874,0179	interest for 4th year.
89963,3050	amount at 4 years.
75439,75	principal for 1st year.
$14523,555	compound interest for 4 years.

(10)

$1.42576 \times 650 = \$926{,}744$. *Ans.*

(11)

$2.65329 \times 3204318 = 8490984.9+$. *Ans.*

(12)

$643,7399	amount for 3 years.
20,9215	interest for 6*mo.* 15*da.*
$664,6614	
540,50	
$124,1614	compound interest for 3*yr.* 6*mo.* 15*da.*

(13)

$147,5362	amount of $75 for 10 years.
4,0449	interest on $147,5362 for 4*mo.* 21*da.*
$151,5811	amount for 10*yr.* 4*mo.* 21*da.*

(14)

$210	amount of $200 for 1 year.
6,3875	interest on $210 for 7*mo.* 9*da.*
$216,3875	
200	
$ 16,3875	compound interest.

(15)

Time is 2 years and 6 months, or 5 times 6 months.

$375,40	principal for first 6 months.
13,139	interest for first 6 months.
$388,539	principal for second 6 months.
13,598	interest for second 6 months.
$402,137	principal for third 6 months.
14,074	interest for third 6 months.
$416,212	principal for fourth 6 months.
14,567	interest for fourth 6 months.
$430,780	principal for fifth 6 months.
15,077	interest for fifth 6 months.
$445,857	amount for 2 years 6 months.

DISCOUNT.

(1)

$615 ÷ 1.09$\frac{1}{3}$ = $562,52 present value.

(2)

$202,58 ÷ 1.098 = $184,497+ present value.

(3)

$721 ÷ 1.03 = $700 present value; 721 − 700 = $21 discount.

(4)

$5160 ÷ 1.032 = $5000 present value.

(5)

$2500 ÷ 1.314 = $1902,587+ present value.

(6)

$3000 ÷ 1.0852 = $2764,4673 present value; $3000 − 2764,4673 = $235,5327 discount.

(7)

$1250 ÷ 1.015 = $1231,527+ present value for 3 *mo.* at 6 *per ct.*
1250 ÷ 1.103 = $1213,592+ " " 6 " "
1250 ÷ 1.045 = $1196,172+ " " 9 " "
1250 ÷ 1.06 = $1179,245+ " " 12 " "
$4820,537 present value of $5000.

(8)

$4987,50 ÷ 1.03906 = $4800,011+ present value.

(9)

Time is 2 months 16 days.

$1400 ÷ 1.014$\frac{7}{9}$ = $1379,6123+ present value.

(10)

10,50 × 300 = $3150 cost.
$12 × 300 = $3600 sold it for on credit.
3600 ÷ 1.0175 = $3538,083 cash value.
3538,083 − 3150 = $ 388,083 gain.

(11)

2500 ÷ 1.015 = $2463,054+ present value.
2500 ÷ 1.03 = $2427,184+ " "
$5000,000 cash.
$9890,239 cash value of the property.

(12)

78 × 86 × .25 = $1677 cost.
78 × 86 × .25½ = $1710,54 what it sold for on 4*mo.* credit.
1710,54 ÷ 1.02⅔ = $1665,909+ cash value of the sale.
1677 − 1665,909 = $11,091+ loss.

(13)

.077669+ cash value, per pound, at 8 cents for 6*mo.*
.073529+ " " " at 7½ " 4 "
.00414 most advantageous to buy at 7½ cents a pound.

(14)

10 × .20 = $2; 10 + 2 = $12; 12 ÷ .90 = $13,33⅓. *Ans.*

PROOF. 10 per cent. of $13,33⅓ = $1,33⅓; $13,33⅓ − 1.33⅓ = $12, asking price.

(15)

The first note is on interest 1 month; the second 3*mo.* 9*da.*; the third 4 months.

$1000 ÷ 1.005 = $995,0248+ present value.
500 ÷ 1.0165 = $491,8839+ " "
900 ÷ 1.02 = $882,3529+ " "
$2369,2617 present value of the 3 notes.

The amount of $1000 for 1 month at 6 per cent. is $1005
" " $ 500 for 3*mo.* 9*da.* " " 508,25
" " $ 900 for 4 months " " 918,00
Value of the 3 notes when due, - - - $2431,25
2369,2617
Difference in present value and when due, - $ 61,9883

BANK DISCOUNT.

(1)

$(300\times.06)\div12=\$1,50$; $1,50\times4.1=\$6,15$. *Ans.*

(2)

$(200\times.09)\div12=\$1,50$; $1,50\times5.1=\$7,65$. *Ans.*

(3)

$(500\times,065)\div12=\$2,7083$; $2,7083\times8.6=\$23,2913$ discount.
$500-\$23,2913=\$476,708$ proceeds

(4)

$(1255,38\times.07)\div12=\$7,323$; $7,323\times4.1=\$30,0243$;
$1255,38-30,0243=\$1225,3557$ proceeds.

(5)

Time is 1 month 15 days.

$(500\times.07)\div12=\$2,916$; $2,916\times1.5=\$4,374$. *Ans.*

(6)

$4368\times1.25=\$5460$ cost of the wheat.
$4368\times1.30=\$5678,40$ sold it for.
$(5678,40\times0.7)\div12=\$33,124$; $33,124\times4.1=\$13,58+$ *dis't.*
$5678,40-13,58=\$5664,82$; $5664,82-5460=\$204,82$ gain.

(7)

$(7000 \times .06) \div 12 = \$35$; $35 \times 7.1 = \$248{,}50$ bank discount.

$7000 \div 1.035 = \$6772{,}946$; $7000 - 6772{,}946$

$= \$227{,}053$ true discount.

$248{,}50 - 227{,}053 = \$21{,}447$ difference.

(8)

$(10000 \times .08) \div 12 = \$66{,}66\frac{2}{3}$; $66{,}66\frac{2}{3} \times 4.6$

$= \$306{,}66\frac{2}{3}$ bank discount.

$10000 \div 1.0225 = \$9779{,}951$; $10000 - 9779{,}951$

$= \$220{,}049$ true discount.

$306{,}666 - 220{,}049 = \$86{,}617$ difference.

(9

Time 4 months 3 days.

$(1000 \times .055) \div 12 = \$4{,}583$; $\$4{,}583 \times 4.1 = \$18{,}79+$ discount.

$1000 - 18{,}79 = \$981{,}21$ cash value.

BANKING.

(2)

$.9644\frac{1}{6}$ present value of \$1 for 6 months 3 days.

$285{,}95 \div .9644\frac{1}{6} = \$296{,}50$. *Ans.*

(3)

.968 present value of \$1 for 6 months 12 days.

$674{,}89 \div .968 = \$697{,}20$. *Ans.*

(4)

When A turns in the note at the bank, it will have 4 months and 3 days to run; therefore, they will take discount on \$1500 for 4 months and 3 days, which will be \$25,625; \$1000+ \$25,625 = \$1025,625 taken from \$1500 leaves \$474,625 what A received back.

(5)

9.125 × 380 = $3467,50 cost of the flour.
.9845 present value of $1 for 3*mo.* 3*da.*, at 6 per cent.
3467,50 ÷ .9845 = $3522,092 face of the note.

COMMISSION.

(3)

3125 + 1520 = $4645 ; 4645 × .0075 = $38,8375. *Ans.*

(4)

750 × 9,75 = $4387,50 ; 4387,50 × .02½ = $98,7187. *Ans.*

(5)

96 × 9½*cwt.* = 902*cwt.* ; 902 × 6,50 = $5863 ;
5863 ÷ 1.01⅝ = $5769,249 +. *Ans.*

(6)

2⅗ + 1⅖ = 4 per cent. commission.
2340 × 1,75 = $4095 first cost of the wheat.
4095 × .04 = $163,80 his commission.
4095 × .06 = $245,70 commission and freight.
$4095 + $245,70 = $1340,70 entire cost of the wheat.

(7)

2564,25 × .045 = $115,39 +. *Ans.*

(8)

267581 × .09½ = $25320,19. *Ans.*

(9)

7320,25 × .06625 = $484,9665 ; 7320,25 − 484,9665
= $6835,283. *Ans.*

(10)

1000 × .065 = $65 ; 1000 − 65 = $935. *Ans.*

(11)

2608,625÷1.025=$2544,9951 purchase money.
2608,625−2544,9951=$63,6299 commission.
2544,9951÷56=4544,62+ bushels. *Ans.*

(12)

$2\frac{3}{5}+\frac{1}{2}=3\frac{1}{10}$=.031 per cent.
2640×.031=81,84 ; 2640=81,84=2558,16. *Ans.*

(13)

42,66÷.018=$2370 purchase money.
240×.06$\frac{1}{4}$=$15 cost of one barrel.
2370÷15 =158 barrels.
2370+42,66=$2412,66 whole amount.

(14)

3476×.12$\frac{1}{2}$=$434,50 the whole amount.
434,50×.03$\frac{1}{8}$=13,578 ; 434,50−13,578=$420,922. *Ans.*

(15)

708,75÷1.05=$675 purchase money.
675÷45=15 tons. *Ans.*

(16)

1500× .025=37,50
1000×.0325=32,50
$70 amount of loss.

(17)

2204×.0075=16,53 ; 2204−16,53=$2187,47 ;
2187,47÷109,3735=20 shares.

(18)

$\frac{5}{8}$ of 2=1$\frac{1}{4}$ per cent.
56448,90×.0125=705,61025 ; 56448,90−705,61025
=$55743,289. *Ans.*

STOCKS AND BROKERAGE.

(1)

$\$1-.05\frac{1}{2}=.94\frac{1}{2}$; $.94\frac{1}{2}+\frac{1}{2}=.95$ cost of \$1 of stock.
$56\times100=\$5600$; $5600\times.95=\$5320$. *Ans.*

(2)

.88 what he paid for \$1 of stock.
$1.06\frac{1}{2}$ what he received for \$1 of stock.
$36\times100=3600$ par value; $3600\times.88=\$3168$; $3600\times1.07\frac{1}{2}$ $=\$3834$; $3834-3168=\$666$ profit.

(3)

$257\times200=\$51400$ par value; $51400\times1,15=\$59110$. *Ans.*

(4)

$150\times120=\$18000$ par value; $18000\times1,18\frac{3}{4}=\$21375$. *A.*

(5)

$\$0.92\frac{3}{4}$ what \$1 of stock cost; $125\times69=\$8625$ par value.
$8625\times.92\frac{3}{4}=\$7999,6875$. *Ans.*

(6)

$\$1+.06\frac{1}{2}+\frac{1}{4}=\$1,06\frac{3}{4}$ cost of \$1 of stock.
$200\times1000=200000$ par value.
$200000\times1.06\frac{3}{4}=213500$. *Ans.*

(7)

$125\times20=\$2500$ par value.
$2500\times.05=\$125$ $2500\times.07=\$175$ 1 year's interest.
$2500\times.04=\$100$ $2500+175=\$2675$ amount.
\$ 225 dividend.

$2500\times1.10=\$2750$ what he sold the stock for; $2750+225$ $=\$2975$ amount including premium and dividends.

$2975-2675=\$300$ profit.

(1)

$3000 \div .85 = \$3529{,}41+$. *Ans.*

(2)

Each share will cost \$114; hence,
\$6384 ÷ \$114 = 56, number of shares. *Ans.*

(3)

\$0.92½ will buy 1 dollar at par value; hence,
\$3700 ÷ .925 = \$4000, the par value of what \$3700 will buy.

(4)

.96¾ market value of \$1 of stock; $7000 \div .96\frac{3}{4} = \$7235{,}142+$.

(5)

\$1,08¾ market value of \$1 of stock; $8700 \div 1{,}0875 = \$8000$.

(6)

$12000 \times .96\frac{1}{2} = \$11580$ market value of the funds.
$1 + .10\frac{1}{4} + \frac{3}{4} = \$1{,}11$ market value of \$1 of bank stock.
$11580 \div 1{,}11 = \$10432{,}432+$. *Ans.*

(1)

\$1 − 12½ cents = \$0.87½, price of \$1 of stock.
\$1 × .07 ÷ .875 = .08, or 8 per cent.

.875	\$1
x	.07

$x = .08$

(2)

\$1 × .08 ÷ .10 = .80 value of \$1 of stock bought.
\$1 − .80 = .20; or rate 20 per ct. discount.

.10	\$1
x	.08

$x = .80$

(3)

5 per cent. would be the annual dividend:
\$1 × .05 ÷ .62½ = .08, or 8 per cent.

.625	\$1
x	.05

$x = .08$

(4)

.875 cost of $1 of stock:
$1 × .07 ÷ .875 = .08, or 8 per cent. is the rate.

.875 | $1
x | .07
x = .08

(5)

$1 × .07 yield of $1 of stock:
.07 ÷ .12 = .5833;
1 − .5833 = .4166, or discount 41⅔ per cent.

.12 | $1
x | .07
x = .5833 +

(6)

$1,20 value of $1 of stock; $1 × .06 ÷ 1.20 = .05 rate of int.

(2)

$1 × .06 ÷ 100 = .06; $1 × .07 ÷ 1.07 = .0654;
7 per cent. the best investment.

(3)

$1 × .08 ÷ 1.20 = .06⅔ rate of profit of 8 per cent.
$1 × .05 ÷ .80 = .0625 rate of profit of 5 per cent.
8 per cent. the best investment.

(4)

$1 × .05 ÷ 1.00 = .05 rate of profit of the 5 per cent.
$1 × .06 ÷ .90 = .06⅔ rate of profit of the 6 per cent.
2000 × .05 × 5 = $500 profit for 5 years of the 5 per cent.
2000 × .06⅔ × 5 = $666,66⅔ for 5 years of the 6 per cent.
$666,66⅔ − 500 = $166,66⅔ difference of proceeds.

PROFIT AND LOSS.

(1)

250 × 9 × .07 = $157,50; 250 × 9 × .08½ = $191,25;
191,25 − 157,50 = $33,75. *Ans.*

(2)

After one-third leaked out, 2*hhd.* remained, equal to 126*gal.*

68,04+2,52=$70,56 what the remainder must sell for

70,56÷126=.56 cents per gallon.

(3)

360×.75=$270 cost of keeping.
360×1.25=$450 value of wool.
90×.62½=$56,25 value of lambs.
(450+56,25)−270=$236,25 profit.

(1)

195,50÷1.15=$170 cost.

(2)

78*cwt.* 3*qr.* 14*lb.*=7889*lb.*; 7889×.08=$631,12;
631,12÷1.15=$548,80 cost.

(3)

$7,015÷.875=$8,01714+ asking price.
$8,01714÷1,335=$6,0053+ cost.

(4)

472,50÷1.35=$350 cost of the first horse.
472,50÷ .90=$525 cost of the second horse.
$875 cost of both horses.

472,50×2=$945 what both horses sold for; 945−875
=$70 gain.

(1)

375×.75=$281,25; 281,25×.20=$56,25; 281,25+56,25
=$337,50; 337,50÷375=$0,90. *Ans.*

(2)

1 pipe = 126 gallons.

322,56 × .25 = $70,64 ; 322,56 + 70,64 = $393,20 ;
393,20 ÷ 126 = $3,20 per gallon.

(3)

3493,33⅓ × .10 = $349,33⅓ ; 3493,33⅓ − 349,33⅓ = $3144 ;
3144 ÷ 3275 = $0,96 per bushel.

(4)

4,70 ÷ .94 = $5,00 cost per yard ; 5,00 × .14 = 70*cts.* gain ;
5,00 + ,70 = $5,70. *Ans.*

(5)

150,25 × .40 = $60,10 gain ; 150,25 × .28 = $42,07 loss ;
60,10 − 42,07 = $18,03 balance of gain.

(6)

144 − 36 = 108 gallons remains.
144 × .45 = $64,80 cost ; 64,80 × .10 = $6,48 gain ;
64,80 + 6,48 = $71,28 ; 71,28 ÷ 108 = $0,66 per gallon.

(7)

5 + 3 + 2 + 40 = 50 per cent. to be gained.
3500 × 1,20 = $4200 cost ; 4200 × .50 = $2100 gain ;
4200 + 2100 = $6300 ; 6300 ÷ 3500 = $1,80 per bushel.

(1)

425 − 348,50 = $76,50 whole gain ; 76,50 ÷ 425
= 18, or 18 per cent.

(2)

.07½ − .06 = .015 gain ; .015 ÷ .06 = .25 gain per cent.

(3)

1.20 − .90 = .30 ; .30 ÷ .90 = .33⅓ per cent. on the rye.
1.50 − 1.12½ = .37½ ; .375 ÷ 1.125 = .33⅓ per cent. on the wheat.

(4)

$20 \times .18 = \$3,60$ what it sold for per ream ;
$\$3,60 - \$2 = \$1,60$ gain per ream ;
$1,60 \div 2 = .80$ gain per cent.

(5)

$13cwt.\ 3qr.\ 14lb. = 13,89cwt.$, or 1389 pounds.
$13,89 \times 8 = \$111,12$ cost ; $1389 \times .10 = \$138,90$ what it sold for.
$138,90 - 111,12 = \$27,78$ whole gain.
$27,78 \div 111,12 = .25$ gain per cent.

(6)

$45\,T.\ 16cwt.\ 25lb. = 45.8125$ tons;
$45,8125 \times 75 = \$3435,9375$ cost ; $45,8125 \times 78,50$
$= \$3596,28125$ what it sold for;
$3596,28125 - \$3435,9375 = \$160,34375$ whole gain ;
$160,34375 \div 3435,9375 = .046+$ gain per cent.

(7)

$10 \div 1,25 = \$8$ cost; $11,60 - 8 = \$3,60$ whole gain.
$3,60 \div 8 = .45$ gain per cent.

(8)

$25650 \times 19,20 \div 1000 = \$492,48$; $492,48 \div 1,20 = \$410,40$ cost.
$25650 \times 15 \div 1000 = \$384,75$; $410,40 - 384,75 = \$25,65$ loss.

(9)

$3881,25 \div 1,125 = \$3450$ cost ; $3450 - 3277,50$
$= \$172,50$ whole loss ; $172,50 \div 3450 = .05$ loss per cent.

(10)

$.66 \div 1,20 = .55$ cost ; $.77 - .55 = .22$ gain on $1lb.$ $.22 \div .55$
$= .04$ gain per cent.

(11)

$5520 \times .50 = \$2760$, what the corn sold for; $2760 \div .92 = \$3000$, what it cost; $5520 \times .60 = \$3312$; $3312 - 3000 = \$312$, whole gain; $312 \div 3000 = .10\frac{2}{5}$, gain per cent.

(12)

$1412\frac{1}{2} \times 3 \times .11 = \$466,125$; $466,125 \div 1,375 = \$339$, cost. $339 \times .50 = \$169,50$, gain; $339 + 169,50 = \$508,50$. *Ans.*

INSURANCE.

(1)

$147674 \times .03\frac{1}{2} = \$5168,59$. *Ans.*

(2)

$47520 \times .005 = \$237,60$. *Ans.* $47520 \times .00\frac{1}{3} = \$158,40$. *Ans.*

(3)

$16800 \times .015 = \$252$. *Ans.* $16800 \times .0075 = \$126$. *Ans.*

(4)

$\frac{2}{3}$ of $\frac{3}{4} = \frac{1}{2}$; $\frac{1}{2}$ of $24000 = \$12000$; $12000 \times .025 = \$300$. *Ans.*

(5)

$5640 \times .0075 = \$42,30$; $7560 \times .00625 = \$47,25$; $42,30 + 47,25 = \$89,55$. *Ans.*

(6)

$425 \times 15 \times .0075 = \$47,8125$. *Ans.*

(7)

$150 \times 63 \times .35 = \$3307,50$, first cost; $150 \times 63 \times .50 = \$4725$, selling price; $4725 \times .035 = \$165,375$, insurance; $3307,50 + 165,375 = \$3472,875$, whole cost; $4725 - 3472,875 = \$1252,125$, gain. *Ans.*

(8)

$3640 \times .045 = \$163{,}80$. *Ans.*

(9)

$12000 \times .0275 = \$330$; $18500 \times .0325 = \$601{,}25$; $330 + 601{,}25 = \$931{,}25$; $20450 + 25600 + 931{,}25 = \$46981{,}25$; $12000 + 18500 = \$30500$; $46981{,}25 - 30500 = \$16481{,}25$, total loss.

(10)

$5000 \times 10{,}50 = \$52500$, value of the flour; $2887{,}50 \div 52500 = .05\frac{1}{2}$, per cent for insurance.

(11)

$120 \div 7500 = .01\frac{3}{5}$ per cent.

(12)

$225 \times 40 \times 3{,}50 = \$31500$, cost of cloth; $\$1323 \div 31500 = .04\frac{1}{2}$ per cent for insurance.

(13)

$1320 \div .055 = \$24000$. *Ans.*

(14)

$51 \div .015 = \$3400$, value of storehouse; $126{,}45 \div .0225 = \$5620$, " contents.

$\$9020$, whole value of property insured.

(15)

$275 \times 15 = \$4125$, value of pianos; $\$4125 \times .03 = \$123{,}75$, premium; $123{,}75 \times .03 = \$3{,}7125$, insurance on premium; $123{,}75 + 3{,}7125 = \$127{,}4625$, amount of insurance.

(16)

$16750 \times .0175 = \$293{,}125$, premium; $16750 + 293{,}125 = \$17043{,}125$, base and premium.

LIFE INSURANCE.

(1)

$8950 \times 1{,}36 \div 100 = \$121{,}72$. *Ans.*

(2)

$12500 \times 1{,}86 \div 100 = \$232{,}50$. *Ans.*

(3)

$\$15000 \times 1{,}75 \div 100 = \$262{,}50$. *Ans.*

(4)

$\frac{1}{2}$ of $\frac{4}{5} = \frac{2}{5}$ per cent. = 40 cents on \$100.

$5000 \times 40 \div 100 = \$20$. *Ans.*

(5)

$2000 \times 4{,}91 \div 100 = \$98{,}20$. *Ans.*

(6)

$4\frac{3}{5}$ per cent. = \$4,60 premium on \$100 ; $1500 \times 4{,}60 \times 20 \div 100 = \$1380$; $1500 - 1380 = \$120$. *Ans.*

(7)

\$1000 × 2,71 = \$271 annual premium.
\$271 paid at the beginning of the 1st year.
\$271 " " " " 2d "
\$271 " " " " 3d "
\$46,175 interest on \$271 2 years 6 months.
\$27,705 interest on \$271 for 1 year 6 months.
\$ 9,235 interest on \$271 for 6 months.
\$896,115 ; \$1000 − \$896,115 = \$103,885. *Ans.*

ENDOWMENTS AND TAXES.

(1)

$(164{,}46 \times 250) \div 100 = \$311{,}15$. *Ans.*

(2)

$(210{,}53 \times 360) \div 100 = \$757{,}908$. *Ans.*

(3)

$(188{,}83 \times 650) \div 100 = \$1227{,}395$. *Ans.*

(4)

$(376{,}84 \times 350) \div 100 = \$1318{,}94$. *Ans.*

ANNUITIES.

(1)

$12{,}821153 \times 550 = \$7051{,}63415$. *Ans.*

(2)

$860 - 25 = \$835$; $10{,}83777 \times 835 = \$9049{,}53795$. *Ans.*

(3)

$15{,}372451 \times 1500 = \$23058{,}6765$. *Ans.*

(4)

$1250 - 30 = 1220$; $13{,}406164 \times 1220 = \$16355{,}52+$. *Ans.*

(5)

$27560 \div 12{,}550358 = \$2195{,}95$; $2195{,}95 - 35 = \$2160{,}90$. *A.*

(6)

$25000 \div 11{,}469921 = \$2179{,}63$; $2179{,}63 - 20 = \$2159{,}63$. *A.*

TAXES.

(1)

$350 \times 1{,}50 = \$525$; $1465{,}50 + 350{,}25 + 200{,}25 = \$2016$;
$2016 - 525 = \$1591$; $1590 \div 318200 = .004 = \frac{2}{5}$ per cent.

(2)

$98415 \times .25 = \$24603{,}75$; $100406 - 24603{,}75 = \$75802{,}25$;
$75802{,}25 \div .002 = \$37901125$. *Ans.*

(3)

$56450 \times .25 = \$14112{,}50$ poll tax; $87467 - 14112{,}50$
$= \$73354{,}50$; $73354{,}50 \div 4890300 = .015 = 1\frac{1}{2}$ per cent.
$5400 \times .015 = \$81$; $81 + (.25 \times 5 = 1{,}25) = \$82{,}25$. *Ans.*
$3760{,}50 \times .015 = \$56{,}4075$; $56{,}4075 + .50 = \$56{,}9075$. *Ans.*

(4)

$40 \times .50 = \$20$; $957{,}50 - 20 = \$937{,}50$; $937{,}50 \div 125000$
$= .0075 = \frac{3}{4}$ per cent. *Ans.*
$2000 \times .0075 = \$15$; $15 + .50 = \$15{,}50$. *Ans.*

(5)

$5674{,}50 \div .975 = \$5820$. *Ans.*

(6)

$21346{,}75 \div .96 = \$22236{,}197$ *Ans.*

(7)

$4423{,}2475 \div .95 = \$4656{,}05$ whole tax to be raised.
$150 \times .50 = \$75$ poll tax; $4656{,}05 - 75 = \$4581{,}05$ to be raised on taxable property.
$4581{,}05 \div 916210 = .005$, or $\frac{1}{2}$ per cent. *Ans.*

$2100 + 3000 = 5100$; $5100 \times .005 = \$25{,}50$; $25{,}50 +$
$1{,}50 = \$27$. *Ans.*
$1275{,}50 \times .005 = \$6{,}3775$; $6{,}3775 + .50 = \$6{,}8775$ G's tax. *A.*
$2456 \times .005 = \$12{,}28$; $12{,}28 + .50 = \$12{,}78$ H's tax. *A*

(8)

$2850 \div 190000 = .015$, or $1\frac{1}{2}$ per cent. *Ans.*

$7500 \times .015 = \$112{,}50$. *Ans.*

$1200 \times .015 = \$18$. *Ans.*

(9)

$60 \times 6 = \$360$; $360 + 66 = \$426$; $426 - 41{,}60 = \$384{,}40$;
$384{,}40 \div 7688 = .05$ tax per day; $148 \times .05 = \$7{,}40$. ***Ans.***

$184\frac{1}{2} \times .05 = \$9{,}225$. *Ans.*

CUSTOM HOUSE BUSINESS.

(3)

$9cwt.\ 3qr.\ 24lb. = 999lb.$; $999 - 146 = 853lb.$
$10cwt.\ 2qr.\ 12lb. = 1062lb.$; $1062 - 150 = 912lb.$
$11cwt.\ 1qr.\ 24lb. = 1149lb.$; $1149 - 158 = 991lb.$
$2756lb. = 27.56cwt.$

$27.56 \times \$9{,}47 = \$260{,}9932$. *Ans.*

(4)

$6cwt.\ 2qr.\ 14lb. = 664lb.$; $664 - 94 = 570lb.$
$9cwt.\ 1qr.\ 20lb. = 945lb.$; $945 - 100 = 845lb.$
$6cwt.\ 2qr.\ 22lb. = 672lb.$; $672 - 88 = 584lb.$
$7cwt.\ 2qr.\ 24lb. = 774lb.$; $774 - 89 = 685lb.$
$8cwt.\ 0qr.\ 13lb. = 813lb.$; $813 - 100 = 713lb.$
$3397lb.$

$3397 \times .21 = \$713{,}37$. *Ans.*

(5)

$8cwt.\ 3qr.\ 14lb. = 8.89cwt.$; $8.89 \times 18 = 160.02cwt.$;
$160.02cwt. \times 16 = 2560{,}32lb. = 25.6032cwt.$; $160{,}02 - 25{,}6032$
$= 134.4168cwt. = 6\,T.\ 14cwt.\ 1qr.\ 16{,}58lb.$ ***Ans.***

(6)

4 *T.* 3*qr.*=83.75*cwt.*; 83.75×20=1675*lb.*=16.75*cwt.*;
83.75—16.75=67*cwt.*=3 *T.* 7*cwt.* *Ans.*

(7)

7 *T.* 11*cwt.* 3*qr.*=151.75*cwt.*; 151.75×12=1821*lb.*
=18.21*cwt.*; 151.75—18.21=133.54*cwt.*;
133.54×2,31=$308,4774. *Ans.*

(8)

19*cwt.* 1*qr.* 24*lb.*=1949*lb.*; 1949—149=1800*lb.*=18*cwt.*;
18×24.28=$437,04;
12*cwt.* 3*qr.* 19*lb.*=1294*lb.*; 1294—49=1445*lb.*=12.45*cwt.*
12.45×28.56=$355,572; 437,04+355,572=$792,612. *A.*

(9)

10*cwt.* 1*qr.* 14*lb.*=10.39*cwt.*; 10.39×17¼=179.2275*cwt.*, or
17922.75*lb.*; 7+4=11*lb.*; 179.2275×11
=1971.5025*lb.* draft and tare.
17922.75—1971.5027=15951.2475*lb.*=159.512475*cwt.*;
159,512475×$7,50=$1196,343+. *Ans.*

(10)

3*cwt.* 3*qr.* 14*lb.*=3.89*cwt.*; 3.89×29=112.81*cwt.*, or 11281*lb.*;
8+4=12*lb.* draft and tare; 112.81×12=1353,72;
11281—1353,72=9927.28*lb.*=99,2728*cwt.*; 99.2728×7,50
=744,546. *Ans.*

(11)

4*cwt.* 3*qr.* 14*lb.*=4.89*cwt.*; 4 89×7=34.23*cwt.*;
34.23×7=239.61*lb.* draft; 8×7=56*lb.* tare; 239.61+56+
99.75=395.36*lb.*; 3423—395.36=3027.64*lb.*=30.2764*cwt.*;
30.2764×8,45=$255,835+. *Ans.*

(12)

22,50+12,49+5,11+1,31=$41,41 ; 11*cwt.* 1*qr.* 15*lb.* =11.40*cwt.*, or 1140*lb.* ; 11.40×11$\frac{1}{5}$=127.68*lb.* tare ; 1140—127.68=10.1232*cwt.*

41,41÷10.1232*cwt.*=$4,09+. *Ans.*

(13)

3*cwt.* 2*qr.* 14*lb.*=3.64*cwt.*, or 364*lb.* ; 3.64×7=25.48*cwt.* ; 25.48×21=535.08*lb.* ; 2548—535.08=2002,92×$6,25 =$125,18$\frac{3}{4}$. *Ans.*

(14)

87×47=4089*gal.* ; 4089×9=36801*lb.* ; 36801÷11 =3345,5454+ tare ; 36801—3345.5454=32455.4546*lb.* =324.55454*cwt.*+ ; 324.554546×1,19=$386,219+. *Ans.*

(15)

13*cwt.* 1*qr.* 12*lb.*=1337*lb.* ; 1337×5=6685*lb.*, or 66.85*cwt.* ; 1$\frac{1}{2}$+5$\frac{1}{2}$=7*lb.* ; 66.85×7=467.95*lb.* ; 6685—467,95 =6217.05*lb.* nett weight ; 6217.05×.07$\frac{1}{2}$=$466,278+. *Ans.*

(16)

450×76=34200*lb.* ; 34200×.08=2736*lb.* tare ; 34200—2736 =31464*lb.* nett weight ; 31464×.10$\frac{1}{2}$=$3303,72 cost ; 3303,72×.33$\frac{1}{3}$=$1101,24 whole gain ; 3303,72+1101,24 =$4404,96 ; 4404,96÷31464=.14 cents per pound, the selling price. *Ans.*

(17)

176×46$\frac{1}{4}$=8140*yd.* ; 8140×3,25=$26455 ; 26455×.30 =$7936,50 duty. *Ans.*

(18)

54*T.* 13*cwt.* 3*qr.* 20*lb.*=54.6975 tons ; 54.6975×45 =$2461,3875 cost; 2461,3875×.33$\frac{1}{3}$=$820,4625 duty. *Ans.*

(19)

3.×63=189*gal.*; 189×.02=3.78*gal.* leakage;
189−3,78=185.22*gal.*; 185.22×.35=$64,827 cost;
64,827×.25=$16,206+ duty. *Ans.*

(20)

140×50=7000*lb.*=70*cwt.*; 70×10=700*lb.* tare;
7000−700=6300*lb.*; 6300×.60=$3780 cost;
3780×.40=$1512 duty. *Ans.*

(21)

225×160=36000*lb.*; 36000×.02=720 tare;
36000−720=35280*lb.*; 35280×.06=$2116,80 cost;
2116.80×.20=$423,36 duty. *Ans.*

(22)

275×2¾=756,25 *gal.*; 756.25×.05=37.8125 tare; 756,25
−37.8125=718.4375*gal.*; 718.4375×.35
=$251,453+ duty. *Ans.*

(23)

175×196=34300*lb.*; 34300×.15=5145*lb.* tare;
34300−5145=29155 nett weight:
29155×.05=$1457,75 duty. *Ans.*

(24)

2*cwt.* 2*qr.* 24*lb.*=2.74*cwt.*; 2.74×75=205.5*cwt.*; 205.5×.11
=22.605 tare; 205.5−22.605=182.895*cwt.* nett weight;
18289.5×.01⅞=$342,928; 342,928×.20
=$68,5856 duty. *Ans.*

EQUATION OF PAYMENTS.

(1)

200 × 4 = 800
400 × 10 = 1000
600 × 16 = 9600
1200 1200)11400(9*mo.* 15*da.* *Ans.*

(2)

800 × 6 = 4800
600 × 8 = 4800
1000 × 12 = 12000
2400)21600(9*mo.* *Ans.*

(3)

750 × 4 = 3000
1500 × 6 = 7000
2250 × 12 = 27000
4500)37000(8$\frac{2}{9}$*mo.* *Ans.*

(4)

240 × 3 = 720
360 × 5 = 1800
600 × 10 = 6000
1200)8520(7*mo.* 3*da.* *Ans.*

(5)

960 × 00 = 000
960 × 6 = 5760
960 × 7 = 6720
960 × 12 = 11520
3840)24000(6$\frac{1}{4}$*mo.* *Ans.*

(6)

$150\times8=1200$; $176\times8{,}50=\$1496$; $200\times9=\$1800$.

$1200\times\ 0=$
$1496\times15=22440$
$1800\times40=72000$
$4496\ \ )94440(21+$ days. *Ans.*

(7)

$1000\times\ 0=$
$1200\times\ 3=\ 3600$
$\ 800\times\ 8=\ 6400$
$1500\times10=15000$
$\ 500\times12=\ 6000$
$5000\ \ )31000(6mo.\ 6da.$ *Ans.*

(8)

$200\times\ 0=$
$150\times31=\ 4650$
$250\times45=11250$
$600\ \ )15900(26\frac{1}{2}da.$ July 28th. *Ans.*

(9)

$\ 45\times00=$
$100\times15=\ 1500$
$576\times35=20160$
$1050\times61=64050$
$1771\ \ )85710(48\frac{702}{1771}$ days.

It will fall due on the 19th of September. *Ans.*

(10)

			days.	*days.*
Bought April 1st,	Due Dec. 1st,		$4350\times00=$	0000
" May 7th,	" Jan. 7th,		$3750\times37=$	138750
" June 5th,	" Feb. 5th,		$2550\times66=$	168300
			10650	)306050($28\frac{155}{213}da.$

The whole would become due in $28\frac{155}{213}$ days from Dec. 1st, *or on Dec.* 30th.

(11)

			days.	days.
Aug. 1st,	1857,	$ 800	× 00	= 00000
Sept. 1st,	"	$ 700	× 31	= 21700
" 15th,	"	$ 900	× 75	= 67500
Oct. 25th,	"	$1000	× 85	= 85000
		$3400		)174200(51$\frac{4}{17}$ *da.*

The above bills would become due in 51$\frac{4}{17}$ days from the time the first falls due, which is Aug. 1st, 1857; therefore, the equated time would be Sept. 22d, 1857. *Ans.*

(12)

			days.	days.
Jan.	1st, 1855,	$367,20	× 00	=
"	28th, "	$901,80	× 27	= 24348,60
Feb.	24th, "	$826,38	× 54	= 44624,52
Mar.	30th, "	$854,88	× 88	= 75229,44
May	1st, "	$396,50	× 119	= 47183,50
		$3346,76		)191386.06(57+*da.*

The equated time for the payment of the above bills would be something more than 57 days from the time the first becomes due, which is on May 1st, 1855, making the equated time June 28th, 1855. *Ans.*

ALLIGATION.

(1)

1 × .75	=	.75
3 × .50	=	1.50
2 × .37$\frac{1}{2}$	=	.75
6		)3.00(.50. *Ans.*

(2)

1 × .37$\frac{1}{2}$	=	.37$\frac{1}{2}$
1 × .50	=	.50
1 × .62$\frac{1}{2}$	=	.62$\frac{1}{2}$
1 × .80	=	.80
1 × 1.00	=	1.00
5		)3.30(.66. *Ans.*

(3)

$5\times.60=3.00$
$3\times.90=2.88$
$4\times.\ 0=\ 00$
12)5.88(.49. *Ans.*

(4)

$50\times.\ 2.=100.$
$60\times.90\ =\ 54.00$
$36\times.62\frac{1}{2}=\ 22.50$
$50\times.39\ =\ 19.50$
196)196.00($1,00. *A.*

(5)

$1\times70\ =70$
$1\times73\ =73$
$1\times73\frac{1}{2}=73\frac{1}{2}$
$1\times77\ =77$
$1\times70\ =70$
$1\times80\frac{1}{2}=80\frac{1}{2}$
$1\times81\ =81$
7)525(75. *Ans.*

(6)

$1\times18=18$
$1\times21=21$
$1\times17=17$
$1\times19=19$
$1\times20=20$
5)95(19. *Ans.*

(7)

$34\times.05=\ 1.70$
$102\times.08=\ 8.16$
$136\times.10=13.60$
$34\times.12=\ 4.08$
306 27.54
13.77 50 *p. ct.*
27.31
306)41.10(.13½. *A.*

(8)

$8\times.30=2.40$
$11\times.25=2.75$
$25\times.07=1.75$
44 6.90
.15 6.60
6.60 .30 loss. *A.*

(1)

$$12\left\{\begin{matrix}8\\10\\14\end{matrix}\right\}\ \left|\ \begin{matrix}\frac{1}{4}\\ \\ \frac{1}{2}\end{matrix}\ \right|\ \left|\ \begin{matrix}\ \\ \frac{1}{2}\\ \frac{1}{2}\end{matrix}\ \right|\ \left|\ \begin{matrix}1\\ \\ 2\end{matrix}\ \right|\ \left|\ \begin{matrix}\ \\ 1\\ 1\end{matrix}\ \right|\ \left|\ \begin{matrix}1\\ 1\\ 3\end{matrix}\ \right.$$

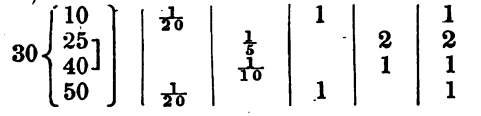
1*lb.* at 8 cents; 1*lb.* at 10 cents; 3*lb.* at 14 cents.

(2)

$$60\left\{\begin{matrix}40\\65\\75\end{matrix}\right\}\ \left|\ \begin{matrix}\frac{1}{20}\\ \frac{1}{5}\\ \ \end{matrix}\ \right|\ \left|\ \begin{matrix}\frac{1}{20}\\ \ \\ \frac{1}{15}\end{matrix}\ \right|\ \left|\ \begin{matrix}1\\ 4\\ \ \end{matrix}\ \right|\ \left|\ \begin{matrix}3\\ \ \\ 4\end{matrix}\ \right|\ \left|\ \begin{matrix}4\\ 4\\ 4\end{matrix}\ \right.$$

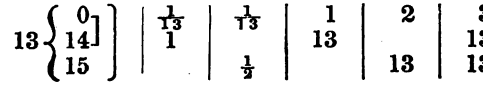
4 pounds of each.

(3)



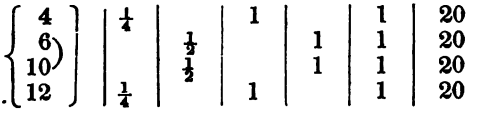
1 calf, 2 cows, 1 ox, 1 colt.

(4)



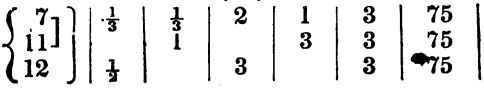
3 gallons of water.

(1)



20 pounds of each kind.

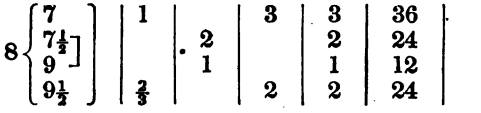
(2)



75 pounds of each.

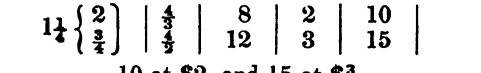
171

(3)



36*gal.* at 7*s.*, 24*gal.* at 7*s* 6*d.* and 9*s.* 6*d.*, 12*gal.* at 9*s.*

(4)



10 at \$2, and 15 at \$$\frac{3}{4}$.

(5)

5	$\frac{1}{3}$		2			2	2	25
7		1		2		2	2	25
$7\frac{1}{2}$					8	8	8	100
$9\frac{3}{4}$			$\frac{3}{4}$		3	3	3	$37\frac{1}{2}$
10	$\frac{1}{2}$	$\frac{1}{2}$	3	1		4	4	50

(1)

5	$\frac{1}{2}$		1	1	22
6		1		1	22
8		1		1	22
9	$\frac{1}{2}$			1	22

$1+1+1+1=4$; $88 \div 4=22$.

(2)

0	$\frac{4}{9}$	$\frac{4}{9}$	4	4	8	2	9
$2\frac{1}{2}$		4		36	36	9	$40\frac{1}{2}$
3	$\frac{4}{3}$		12		12	3	$13\frac{1}{2}$

$2+9+3=14$; $63 \div 14=4\frac{1}{2}$.

(3)

$\frac{3}{4}$	$\frac{20}{9}$	$\frac{20}{9}$	220	20	240	4	16
$1\frac{1}{4}$		20		180	180	3	12
$1\frac{3}{4}$	$\frac{20}{14}$		180		180	3	12

Ans. 16 lambs, 12 sheep, 12 calves.

(4)

6	$\frac{1}{3}$		10		10	2	8
7		$\frac{1}{2}$		10	10	2	8
19	$\frac{1}{10}$	$\frac{1}{10}$	3	2	5	1	4

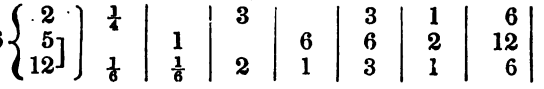
$20 \div 5=4$; *Ans.* 4, 8 and 8.

(5)

4	1	1	1	5	3	1	9	90
6			1			1	1	10
8		$\frac{1}{3}$			1		1	10
10	$\frac{1}{5}$			1			1	10

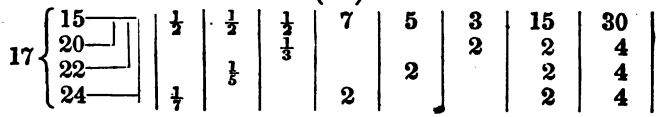
$9+1+1+1=12$; $120 \div 12=10$.

(6)



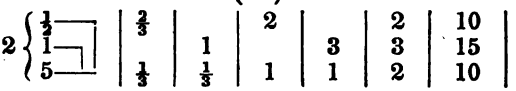
$1+2+1=4$; $24\div 4=6$.

(7)



$15+2+2+2=21$; $42\div 21=2$.

(8)



$2+3+2=7$; $35\div 7=5$.

EXCHANGE.

(1)

$8465\times .01\frac{1}{2}=\$126{,}975$; $8465+126{,}975=\$8591{,}975$. *Ans.*

(2)

$8746{,}50\times .01\frac{1}{4}=\$109{,}33125$; $8746{,}50-109{,}33125$
$=\$8637{,}168+$. *Ans.*

(3)

$9876{,}40\times .01=\$98{,}764$; $9876{,}40-98{,}764=\$9777{,}636$. *Ans.*

(2)

£36794.4375 × .07¾ = £2851.5689+; 36794.4375 + 2851.5689
= £39646.0064; 39646.0064 × 4.44⅘ = $176204.4729+. *A.*

(3)

$67894,25 ÷ 4.84443 = £14014.909 + = £14014 18*s.* 2*d.* +.

(4)

£1256.9375 × .07½ = £94.2703 ; 1256.9375 + 94.2703 = £1351.2078 ; 1351.2078 × 4.44⅘ = $6005,368. *Ans.*

(5)

£364.9333 × .08¼ = £30.10699 + ; 364.9333 + 30.10699 = 395.0402 ; 395.0402 × 4.44⅘ = $1755,734 + ; 1755,734 − 947,86 = $807,874 +. *Ans.*

(2)

$17326,274 ÷ .186 = 93152.01 + francs ; 93152.01 − 86978 = 6174.01 ; 6174.01 ÷ 86978 = .07 per cent. *Ans.*

(3)

18.6 × .03 = .558 ; 18.6 − .558 = 18.042 cents.
68097 × 18.042 = $12286,06. *Ans.*

(4)

$16785,25 × 5.04 = 84597 francs 66 centimes. *Ans.*

(1)

35 × .02 = .7 ; 35 + .7 = 35.7 cents ; 18649 × 35.7 = $6657,693.

(2)

3678 × .34 = $1250,52. *Ans.* ; 35 − 34 = .01 ; .01 ÷ 35 = .03 per cent. nearly, below par.

TONNAGE.

(1)

75 × (⅜ of 20) × 17 = 21420 ; 21420 ÷ 95 = 225 $\frac{9}{19}$ tons. *Ans.*

(2)

90*ft.* × 22*ft.* 7*in.* × 20*ft.* 6*ft.* = 41666¼ *ft.* ; 41666¼ ÷ 95 = 438 $\frac{45}{74}$ tons. *Ans.*

(3)

$154ft. \times 30ft.\ 8in. \times 14ft.\ 8in. = 69265\frac{7}{8}ft.$; $69265\frac{7}{8} \div 95 = 729\frac{97}{855}$ tons. *Ans.*

(4)

$25ft.\ 6in. \div 2 = 12ft.\ 9in.$ half the depth.

$10ft. - 15.3ft. = 87.7ft.$; $87.7 \times 25.5 \times 12.75 = 28513.4825ft.$;

$28513.4825 \div 95 = 300.14+$ tons. *Ans.*

(5)

$34 - 4 = 30$ feet.

$125 \times 25.5 \times 30 = 95625ft.$; $95625 \div 95 = 1006.57+$ tons.

INVOLUTION.

(1)

$4^2 = 16$. *Ans.*

(2)

$(15)^2 = 225$. *Ans.*

(3)

$(26)^2 = 676$. *Ans.*

(4)

$(142)^2 = 20164$. *Ans.*

(5)

$(463)^2 = 214369$. *Ans.*

(6)

$(1340)^2 = 1795600$. *Ans.*

(7)

$(24.6)^2 = 605.16$. *Ans.*

(8)

$(.526)^2 = .276676$. *Ans.*

(9)

$(3.125)^2 = 9.765625$. *Ans.*

(10)

$(.0524)^2 = .00274576$. *Ans.*

(11)

$(246.25)^2 = 60639.0625$. *Ans.*

(12)

$(\frac{3}{4})^2 = \frac{9}{16}$. *Ans.*

(13)

$(\frac{6}{7})^2 = \frac{36}{49}$. *Ans.*

(14)

$(\frac{7}{9})^2 = \frac{49}{81}$. *Ans.*

(15) $(\frac{13}{14})^2=\frac{169}{196}$. *Ans.*

(16) $(\frac{35}{84})^2=\frac{1225}{7056}$. *Ans.*

(17) $(\frac{125}{247})^2=\frac{15625}{61009}$. *Ans.*

(18) $(2\frac{4}{5})^2=(2.8)^2=7.84$. *Ans.*

(19) $(7\frac{5}{8})^2=(7.625)^2=58.140625$. *Ans.*

(20) $(15\frac{9}{11})^2=(\frac{174}{11})^2=\frac{30276}{121}=250\frac{26}{121}$. *Ans.*

(21) $(225\frac{9}{10})^2=(225.9)^2=51030.81$. *Ans.*

(22) $6^3=216$. *Ans.*

(23) $(24)^3=13824$. *Ans.*

(24) $(72)^3=373248$. *Ans.*

(25) $(125)^3=1953125$. *Ans.*

(26) $(136)^3=2515456$. *Ans.*

(27) $12^4=20736$. *Ans.*

(28) $9^5=59049$. *Ans.*

(29) $(4.25)^3=76.765625$. *Ans.*

(30) $(1.8)^4=10.4976$. *Ans.*

(31) $(32.4)^3=34012.224$. *Ans.*

(32) $(.45)^5=.0184528125$. *Ans.*

(33) $(\frac{15}{16})^3=\frac{3375}{4096}$. *Ans.*

(34) $(\frac{5}{6})^3=\frac{125}{216}$. *Ans.*

(35) $(\frac{3}{8})^4=\frac{81}{4096}$. *Ans.*

(36)

$(14\frac{2}{3})^3=(\frac{44}{3})^3=\frac{85184}{27}=3154\frac{26}{27}$. *Ans.*

(37)

$(2\frac{1}{4})^5=(\frac{9}{4})^5=57\frac{681}{1024}$. *Ans.*

(38

$(\frac{25}{27})^4=\frac{390625}{531441}$. *Ans.*

(39)

$(24\frac{3}{5})^3=(24.6)^3=14886.936$. *Ans.*

(40)

$(.25)^6=.000244296875$. *Ans.*

(41)

$(142.5)^3=2893640.625$. *Ans.*

(42)

$(3.205)^2=10.272025$. *Ans.*

SQUARE ROOT.

(1)

$\sqrt{49}=7$. *Ans.*

(2)

$\sqrt{144}=12$. *Ans.*

(3)

$\sqrt{225}=15$. *Ans.*

(4)

$\sqrt{2304}=48$. *Ans.*

(5)

$\sqrt{\frac{36}{81}}=\frac{6}{9}$. *Ans.*

(6)

$\sqrt{\frac{225}{2304}}=\frac{15}{48}$. *Ans.*

(7)

$\sqrt{.0196}=.14$. *Ans.*

(8)

$\sqrt{6.25}=2.5$. *Ans.*

(9)

$\sqrt{278.89}=16.7$. *Ans.*

(10)

$\sqrt{6275025}=2505$. *Ans.*

(11) $\sqrt{7994}=89.409+$. *Ans.*

(12) $\sqrt{.205209}=.453$. *Ans.*

(13) $\sqrt{\frac{7}{8}}=\sqrt{.875}=.93+$. *Ans.*

(14) $\sqrt{\frac{15}{16}}=\sqrt{.9375}=.9682+$. *A.*

(15) $\sqrt{\frac{1}{40}}=\sqrt{.025}=.1581+$. *A.*

(16) $\sqrt{.60794}=.779+$. *A.*

(17) $\sqrt{.022201}=.149$. *Ans.*

(18) $\sqrt{25.1001}=5.01$. *Ans.*

(19) $\sqrt{196.425}=14.015+$. *Ans.*

(20) $\sqrt{1.5}=1.2247+$. *Ans.*

(21) $\sqrt{\frac{2809}{6241}}=\frac{53}{79}$. *Ans.*

(22) $\sqrt{\frac{9}{49}}=\frac{3}{7}$. *Ans.*

(23) $\sqrt{\frac{2}{25}}=\sqrt{08}=.2828+$. *Ans.*

(24) $\sqrt{135}=11.618+$. *Ans.*

(25) $\sqrt{19000}=137.84$. *Ans.*

(26) $\sqrt{.784}=.885+$. *Ans.*

(27) $\sqrt{5647.5225}=75.15$. *Ans.*

(28) $\sqrt{160048.0036}=400.06$. *A.*

(1) $(50)^2-(40)^2=900$; $\sqrt{900}=30ft$. *Ans.*

(1) $\sqrt{117649}=343$. *Ans.*

(2) $\sqrt{48841}=221$ stones.

(3)

$810 \times 10 = 8100 sq.\,ft.$ area of garden;
$\sqrt{8100} = 90 ft.$ length of one side;
$90 \times 4 = 360 ft.$ length of four sides;
$360 \div 16\frac{1}{2} = 21\frac{9}{11}$ rods.

(4)

$67A.\ 2R. = 10800 sq.\,rd.$; $10800 \div 3 = 3600$; $\sqrt{3600} = 60$ rods wide; $60 \times 3 = 180$ rods long.

(5)

$3200 \div 2 = 1600$ number of trees in half the field.
$\sqrt{1600} = 40$ number of trees in width.
$40 \times 2 = 80$ number of trees in length.

$(80-1) \times 12 = 948$ feet long;
$(40-1) \times 12 = 468$ feet wide;
$948 \times 468 = 443664 sq.\,ft.$

$443664 sq.\,ft. = 10A.\ 0R.\ 29P.\ 168\frac{3}{4} sq.\,ft.$ area of the field.

(6)

$(45)^2 + (60)^2 = 5625$; $\sqrt{5625} = 75 ft.$ *Ans.*

(7)

$(225)^2 - (180)^2 = 18225$; $\sqrt{18225} = 135$ feet high. *Ans.*

(8)

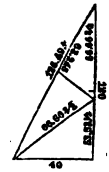
$(65)^2 - (49)^2 = 1824$; $\sqrt{1824} = 42.708 ft.$
$(65)^2 - (39)^2 = 2704$; $\sqrt{2704} = 52.$
$94.708 ft.$ width of street.

(9)

$(120)^2+(40)^2=16000$; $\sqrt{16000}=126.49+$;
and since similar triangles have their like sides proportional,

120 : 126.49 : : 63.245 : $66.66\frac{2}{3}$, the part broken off.

$120-66.66\frac{2}{3}=53\ 33\frac{1}{3}$, height of stump.



(10)

$^2+5^2=50$; $\sqrt{50}=7.0716$ distance from corner to corner on the surface; $(7.0716)^2+5^2=75.0075+$;

$\sqrt{75.0075}=8.66+ft.$ *Ans.*

(11)

$10\times24\times2=480$; $14\times24\times2=672$ miles.

$(480)^2+(672)^2=681984$; $\sqrt{681984}=825.8$ miles

(12)

10 acres $=1600sq.\ rd.$; $\sqrt{1600}=40rd.$, one equal side of a square; $40\times4=160$ rods will fence the square; $160\times2{,}50=400$, cost of fencing the square.

$1600\div4=400sq.\ rd.$, one-fourth the area of the rectangle; $\sqrt{400}=20$ rods, width of rectangle; $20\times4=80$ rods, length; $(80\times2)+(20\times2)=200$ rods will fence the rectangle; $200\times{,}50=\$500$, cost of fencing the rectangle; $500-400=\$100$ difference. *Ans.*

(13)

$1 : 9 : : 25^2 : x^2=5625$; $\sqrt{5625}=75ft.$ *Ans.*

(14)

$120 : 1500 : : 8^2 : x^2=800$; $\sqrt{800}=28.28+ft.$ *Ans.*

(15)

$400 : 1600 : : 3^2 : x^2=36$; $\sqrt{36}=6$ inches. *Ans.*

(16)

$2\frac{1}{2}$ acres $=400sq.\ rd.$; $400\div.7854=509.295923+$; $\sqrt{509.295923+}=22.567rd.$, diameter of the piece of ground; $22.567\div2=11.283$ rods distance from the center to the circumference; $4ft.=.242+$ rods; $11.283-.242=11.041$ rods.

(17)

The grindstone is a cylinder whose base is either of the two side circles, and altitude the thickness of the stone. After the first third is ground off, the remainder is a cylinder whose altitude is the thickness of the stone, and base two-thirds that of the largest circle; and these cylinders having the same altitude, are to each other as their bases.

As two similar figures are to each other as the squares of their like dimensions, two circles are to each other as the squares of their diameters or radii; that is, the square of the radius of the second circle will be two-thirds the square of the largest radius, and the square of the radius of the inner circle will be one-third the square of the largest.

Then, $(24)^2=576$; $576\div3=192sq.\ in.$; $576-192=384$, the square of the middle radius; and $\sqrt{384}=19.595=$ the radius of what is left after the first has ground off his share; $24-19.595=4.405in.$, the thickness of the first share.

Also, $384-192=192$; $\sqrt{192}=13.856in.+$, the inner radius; $19.595-13.856=5.739in.$, the thickness of the second share; and, 13.856, already found, is the thickness of the third share.

CUBE ROOT.

(1)

$\sqrt[3]{1728}=12.$ *Ans.*

(2)

$\sqrt[3]{117649}=49.$ *Ans.*

(3)

$\sqrt[3]{46656}=36.$ *Ans.*

(4)

$\sqrt[3]{15069223}=247.$ *Ans.*

(5) $\sqrt[3]{5735339}=179$. *Ans.*

(6) $\sqrt[3]{48228544}=364$. *Ans.*

(7) $\sqrt[3]{84604519}=439$. *Ans.*

(8) $\sqrt[3]{28991029248}=3072$. *Ans.*

(1) $\sqrt[3]{8.343}=2.026+$. *Ans.*

(2) $\sqrt[3]{1728.729}=12.0014+$. *Ans.*

(3) $\sqrt[3]{.0125}=.232+$. *Ans.*

(4) $\sqrt[3]{19683.46656}=27.0001+$. *Ans.*

(5) $\sqrt[3]{.387420489}=.729+$. *Ans.*

(6) $\sqrt[6]{.000003375}=.015$. *Ans.*

(7) $\sqrt[3]{.0066592}=.185+$. *Ans.*

(8) $\sqrt[3]{81.729}=4.339+$. *Ans.*

(1) $\sqrt[3]{\frac{64}{125}}=\frac{4}{5}$. *Ans.*

(2) $\sqrt[3]{\frac{343}{729}}=\frac{7}{9}$. *Ans.*

(3) $\sqrt[3]{31\frac{15}{343}}=\sqrt[3]{\frac{10648}{343}}=\frac{22}{7}=3\frac{1}{7}$. *A.*

(4) $\sqrt[3]{91\frac{1}{8}}=\frac{7}{2}=3\frac{1}{2}$. *Ans.*

(5) $\sqrt[3]{\frac{343}{512}}=\frac{7}{8}$. *Ans.*

(6) $\sqrt[3]{\frac{729}{15625}}=\frac{7}{25}$. *Ans.*

(7) $\sqrt[3]{\frac{19683}{262144}}=\frac{27}{64}$. *Ans.*

(8) $\sqrt[3]{\frac{13824}{42875}}=\frac{24}{35}$. *Ans.*

(9) $\sqrt[3]{7\frac{6}{7}}=\sqrt[3]{\frac{55}{7}}=1,97+$. *Ans.*

(10) $\sqrt[3]{56\frac{3}{5}}=3.83+$.

(1)

$\sqrt[3]{19683}=27$ feet each way. *Ans.*

(2)

$\sqrt[3]{6859}=19ft.$, length of each side;
$(19)^2\times 6=2166sq.ft.$, area of the whole surface.

(3)

$\sqrt[3]{46656}=36ft.$ long; $(36)^2=1296sq.ft.$, area of one side.

(4)

$150\times 31\frac{1}{2}=4725gal.$; $4725\times 231=1091475$ *c. in.*
$=631.640+$ *c. ft.*; $\sqrt[3]{631.640}=8.57+ft.$, length of one side.

(5)

$1500\div 2=750bu.$; $750\times 2150.4=1612800$ *c. in.*
$=933.333333+$ *c. ft.*; $\sqrt[3]{933.333333}+\ =9.77+$ *ft.*, length and breadth; $9.77\times 2=19.54+$ feet high.

(6)

27 *c. ft.* $\div 2=13.5$ *c. ft.* = half a cubic yard; half a yard in length $=1.5ft.$; $(1.5)^3=3.375$ *c. ft.*; $13.5-3.375$
$=10.125$ *c. ft.* *Ans.*

(7)

\$911,25 = 91125 cents; $\sqrt[3]{91125}=45$ cents, what he paid per yard; $91125\div 45=2025$, whole number of yards.

(9)

$(2.5)^3 : 5^3 : : 8 : x=64$ pounds. *Ans.*

(10)

$4\times 8=512$ *c. ft.*, contents of larger bin;
e side of larger bin.

(11)

$6^3 : 12^3 : : 1 : x=8$ globes. *Ans.*

(12)

$1^3 : (5.5)^3 : : 8 : x=\$1331$. *Ans.*

(13)

$100 : 800 : : 6^3 : x^3=1728$; $\sqrt[3]{1728}=12in.$ long.
$100 : 800 : : 3^3 : x^3=216$; $\sqrt[3]{216}=6in.$ wide.
$100 : 800 : : .5^3 : x^3=1$; $\sqrt[3]{1}=1in.$ thick.

(14)

$3 : 24 : : 12^3 : x^3=13824$; $\sqrt[3]{13824}=24ft.$ long.
$3 : 24 : : 10^3 : x^3=8000$; $\sqrt[3]{8000}=20ft.$ wide.
$3 : 24 : : (4.5)^3 : x^3=729$; $\sqrt[3]{729}=9ft.$ deep.

(15)

$2 : 16 : : 10^3 : x^3=8000$; $\sqrt[3]{8000}=20$ feet. *Ans.*

(16)

$6^3=216$ *c. in.*; $216\div 4=54$; $216-54=162$; $\sqrt[3]{162}=5.45+$, diameter of what remains after the first woman receives her share;

$6-5.45=.54in.$, the first woman's share;

$162-54=108$; $\sqrt[3]{108}=4.76+$; $5.45-4.76=.69in.$, what the second woman had;

$108-54=54$; $\sqrt[3]{54}=3.76+$; $4.76-$ [illegible]he third woman had;

$\sqrt[3]{54}=3.76in.$, what the fourth w

ARITHMETICAL PROGRESSION.

(1)

$(18-1)\times 5=85$; $85+4=89$. *Ans.*

(2)

$(12-1)\times 20=220$; $300-220=\$80$. *Ans.*

(3)

$(15-1)\times 14=196$; $196+200=\$396$. *Ans.*

(4)

0=first term.

$\frac{1}{2}$=com. diff. $(35\frac{2}{3}-1)\times\frac{1}{2}=17\frac{1}{3}$; $17\frac{1}{3}+0=17\frac{1}{3}$*rds.* *A.*

$35\frac{2}{3}$=No. of terms.

(5)

$\frac{1}{2}$=com. diff.; $\frac{1}{2}\times 99=49\frac{1}{2}$; $49\frac{1}{2}+\frac{1}{2}=50$ last term; 100=No. terms; If he travel 300 feet to get the last, it will be 150 feet from his place of starting; $150-50=100$ feet distance from the nearest. *Ans.* 200 feet.

(1)

The first term of the progression is 0, and there are 16 terms.

$75-0=75$; $75\div(16-1)=5$, com. diff.

(2)

$26\frac{1}{2}-\frac{1}{2}=26$; $26\div(14-1)=\$2$, com. diff. *Ans.*

(3)

$14\frac{1}{2}-2\frac{1}{2}=12in.$; $12\div(17-1)=\frac{3}{4}in.$ com. diff. *Ans.*

(1)

$(100+5)=105$; $105\times 26=2730$. *Ans.*

(2)

$(56-1)\times 4=220$; $220+6=226$ last term;
$(226+6)\times 28=\$64{,}96$. *Ans.*

(3)

$\frac{1}{4}=$ com. diff.; $(30-1)\times\frac{1}{4}=7\frac{1}{4}$; $30-7\frac{1}{4}=22\frac{3}{4}$ last term;
$22\frac{3}{4}+30=52\frac{3}{4}$; $52\frac{3}{4}\times 15=791\frac{1}{4}$ miles. *Ans.*

(4)

$1\frac{1}{4}=$ distance apart; $(1\frac{1}{4}\times 119)+1\frac{1}{4}=150$ distance from first to last stone. To fetch the first stone, he must travel $14\frac{1}{2}$ yards, and to fetch the last, 312 yards. $(312+14\frac{1}{2})\times(120\div 2)=19290$ yards, the sum of all the terms.

$19290yds.=10mi.\ 7fur.\ 27rd.\ 1\frac{1}{2}yd.$ *Ans.*

(1)

$(500-.50)\div.09=5550$; $5550+1=5551bu.$ *Ans.*

(2)

$(33-15)\div 1\frac{1}{2}=12$; $12+1=13$, number of terms;
$(33+15)\times(13\div 2)=312$ miles, sum of all the terms.

(3)

$(575-200)\div 75=5$; $5+1=6$, number of instalments. *Ans.*

GEOMETRICAL PROGRESSION.

(2)

$5^8\times 390625$; $390625\times 8=3125000$. *Ans.*

(3)

$(\frac{1}{3})^9=\frac{1}{19683}$; $\frac{1}{19683}\times 729=\frac{1}{27}$. *Ans.*

(4)

$(10)^{14} \times 1 = \$100000000000000$. *Ans.*

(5)

$(2)^6 \times 100 = \$3200$. *Ans.*

(6)

His capital will treble three times in twelve years; hence,

$3 =$ ratio, and $3 =$ number of terms.

$3^2 \times 2000 = \$18000$. *Ans.*

(7)

$2 =$ ratio, and $16 =$ number of terms.

$2^{15} = 32768$ cents $= \$327{,}68$. *Ans.*

(1)

$(78722 \times 3) - 4 = 236162$; $236162 \div 2 = 118081$. *Ans.*

(2)

$1024 - (4 \times \frac{1}{2}) = 1022$; $1022 \div (1 - \frac{1}{2}) = 2044$. *Ans.*

(3)

$4 =$ ratio, and $12 =$ number of terms.

$4^{11} \times 2 = 8388608$, last term.

$(8388608 \times 4) - 2 = 33554430$; $33554430 \div (4 - 1)$
$= \$11184810$, last payment.

(4)

$2 =$ ratio, and $32 =$ number of terms.

$(2^{31} \times 2) - 1 = 4294967295$ cents $= \$42949672{,}95$. *Ans.*

(5)

$2 =$ ratio, and 1 the first term; $2^{63} \times 1 = 9223372036854775808$, last term; $(9223372036854775808 \times 2) - 1$
$= 18446744073709551615$ grains, sum of all the terms, which divided by 7680 gives 2401919801264264 pints, which reduced gives 37529996894754 bushels; this divided by 40 and 1000 gives 938249922 ships, and a small remainder.

ANALYSIS.

(24)

$\frac{2}{3}$ of $\frac{5}{8}=\frac{5}{12}$ of the ship, worth \$1736; $(1736\div 5)\times 12$ =\$4166,40, value of the whole ship.

(25)

If he travel 1 hour a day, it will take him $(7\frac{1}{8}\times 14\frac{2}{3})$ days to perform the journey; if he travel $10\frac{6}{7}$ hours a day, it will take him as many days as $10\frac{6}{7}$ is contained times in $(7\frac{1}{8}\times 14\frac{2}{3})$ $=9\frac{5}{8}$ days.

2	3	44	11
4	8	57	
	16	7	
	8	77	

$9\frac{5}{8}$ days. *Ans.*

(26)

$\frac{1}{9}+\frac{5}{6}=\frac{17}{18}$; $1-\frac{17}{18}=\frac{1}{18}$; then 2 feet is $\frac{1}{18}$ of the pole; 2 is $\frac{1}{18}$ of 18 times 2=36 feet. *Ans.*

(27)

$1-\frac{1}{4}=\frac{3}{4}$ remainder; $\frac{1}{5}$ of $\frac{3}{4}=\frac{3}{20}$; $\frac{1}{4}+\frac{3}{20}=\frac{8}{20}$; $1-\frac{8}{20}=\frac{12}{20}=\frac{3}{5}$; hence \$1062=$\frac{3}{5}$ of the whole sum; $(1062\div 3)\times 5$=\$1770, what he had at first.

(28)

The first will fill $\frac{2}{15}$ of it in 1 hour, and the second $\frac{6}{25}$ of it in 1 hour; $\frac{2}{15}+\frac{6}{25}=\frac{28}{75}$, what both will fill in 1 hour.

It will take as many hours to fill the cistern as $\frac{28}{75}$ is contained times in 1; $1\div\frac{28}{75}=2\frac{19}{28}$ hours. *Ans.*

(29)

One yard will cost $\frac{1}{54}$ of \$9, and 26 yards, 26 times as much as one yard.

3 ~~54~~	~~9~~	13
	~~26~~	
3	13,00	
	\$4,33$\frac{1}{3}$.	*Ans.*

(30)

$\frac{1}{4}$ of $\frac{6}{7}$ of $\frac{7}{9}$ of \$300=\$50; and $\frac{1}{2}$ of $\frac{3}{4}$ of $10\frac{2}{3}$=4 acres.

~~2~~	50	2
	~~4~~	
	\$100.	*Ans.*

(31)

$3\frac{1}{2}=\frac{7}{2}$; $1\frac{3}{8}=\frac{11}{8}$.

2	~~7~~
~~8~~	11
~~7~~	~~8~~
2	11
	$5\frac{1}{2}$ yards. *Ans.*

(32)

7*s.* 6*d.*=$\frac{15}{2}$*s.*; 3*s.* 9*d.*=$\frac{15}{4}$*s.*

	~~234~~	117
~~4~~	~~15~~	
~~15~~	~~2~~	
	117 pounds.	*Ans.*

(33)

3 pipes reduced to gallons multiplied by 2*s.* 9*d.* divided by 6*s.*=\$693.

	~~3~~
	~~2~~
	63
~~6~~	~~4~~
~~4~~	11
	\$693. *Ans.*

(34)

165 yards multiplied by 2*s.* 6*d.* divided by 6*s.* will give the cost of the whole, which divided by 625 pounds will give 11 cents per pound.

2 ~~6~~	~~165~~	11
2	~~5~~	
25 ~~625~~		
100	11.00	
	11 cents.	

(35)

It will cost 4 times as much to keep 4 horses as to keep 1 horse, and 21 times as much for 3 weeks as for 1 day = $56.

		4	2
$		10	7
$		21	
		$56.	*Ans.*

(36)

$10 \times 14 \times 22\frac{1}{2}$ = whole number of yards, which multiplied by 10*s.* 8*d.* and divided by 6*s.* will give $2100.

		10	
¢		14	15
$		45	
$		$2	
		$2100.	*Ans.*

(37)

Divide the cost of the sugar by the quantity of flour reduced to pounds, which will give $7\frac{1}{5}$ cents.

	$	15	3
5		100	
	25	.12	
	100	$	
	5	.36	
		0.07$\frac{1}{5}$.	*Ans.*

(38)

Multiply the number of gallons in 2 hogsheads by 1*s.* 2*d.* and divide the product by 4*s.* 8*d.*, which will give $126.

		2	
		63	
$¢		4	
		14	
		$126.	*Ans.*

(39)

$3 \times 24\frac{1}{2}$ = whole number of yards, which multiplied by 4*s.* 6*d.*, and the product divided by 7*s.* 6*d.* gives $44,10.

		$	
	2	49	
5	$	9	
	15	$	
	10	441	
		$44,10.	*A.*

(40)

120 yards of cloth at 6*s.* 8*d.* per yard, will cost \$100; and 76 bushels of rye at 4*s.* 6*d.* is worth \$57; 100−57=\$43.

\$	120	5
3	20	
	\$100	

¢	76	19
2	4	3
	\$57	

100−57=\$43.

(41)

21×41×1,75=\$1506,75 what he sold the cloth for; 1506,75−1260=\$246,75 gain. *Ans.*

(42)

Since the hour and minute hands are together at 12, and the minute hand passes the hour hand 11 times before they are together again at 12, the minute hand will be with, and pass the hour hand between 5 and 6 in $\frac{5}{11}$ of 12 hours; $\frac{5}{11}$ of 12=$5\frac{5}{11}$*hr.*=5*hr.* 27*m.* $16\frac{4}{11}$*sec.* *Ans.*

(43)

(18×15)÷9=30*sq. yd.*, area of the floor; 30÷$\frac{3}{4}$=40*yd. A.*

(44)

To build the house in 1 month would require 5 times as many hours labor per day as to build it in 5 months; and $\frac{1}{6}$ as many hours per day to build it in 6 months as in 1 month; (5×12)÷6=10 hours per day. *Ans.*

(45)

B and C do $\frac{1}{12}$ of the work in 1 day; A, B and C $\frac{1}{9}$; $\frac{1}{9}-\frac{1}{12}=\frac{1}{36}$ what A will do alone in 1 day; it will take A as many days to do the whole work as $\frac{1}{36}$ is contained times in 1; 1÷$\frac{1}{36}$=36 days. *Ans.*

(46)

A can mow $\frac{1}{3}$ of the field in 1 day; B $\frac{1}{4}$, and C $\frac{1}{5}$ of it; A, B and C can mow $\frac{1}{3}+\frac{1}{4}+\frac{1}{5}=\frac{47}{60}$ in 1 day; 1÷$\frac{47}{60}$=$1\frac{13}{47}$ days, the time it will take the three to mow it.

(47)

$3+5+7+9=24$; The whole must be divided into 24 parts, of which the first must have 3, the second 5, the third 7, and the fourth 9. $480\div 24=20$; $20\times 3=60$, the first; $20\times 5=100$, the second; $20\times 7=140$, the third; $20\times 9=180$, the fourth.

(48)

A square foot is equal to 144 square inches; the area divided by one dimension will give the other. $144\div 8\frac{4}{7}=16\frac{4}{5}in.$ *Ans.*

(49)

At the end of 3 months there would be provision enough for 1800 men 9 months, but being reinforced by 600 men, the provision would last 2400 men but $\frac{3}{4}$ of 9 months, or $6\frac{3}{4}$ months, and at the end of 4 months from this time there will be provision enough for 2400 men $2\frac{3}{4}$ months; but being reinforced by 400 men, it would last 2800 men but $\frac{6}{7}$ of $2\frac{3}{4}=2\frac{5}{14}$ months.

(50)

$117\frac{1}{2}\times 3\frac{1}{2}=\$411{,}25$, cost of broadcloth; $488{,}80-411{,}25=\$77{,}55$, cost of baize; $\frac{1}{5}=\frac{3}{10}$ as much baize as broadcloth; $\frac{3}{10}$ of $117\frac{1}{2}=35.25$ yards of baize; $77{,}55\div 35.25=\$2{,}20$ per yard for the baize.

(51)

$40\times 3\frac{1}{2}=140cwt.$; $10\times 12=120cwt.$; The freight of 1*cwt.* would be $\frac{1}{140}$ as much as of 140*cwt.*, and for 1 mile $\frac{1}{150}$ as much as for 150 miles; the freight of 120*cwt.* would be 120 times as much as for 1*cwt.*, and for 50 miles 50 times as much as for 1 mile.

140 |	42 6
150 |	120 2
	50
	\$12. *Ans.*

(52)

If 70 oranges are worth 84 lemons, 50 oranges or 1 pound are worth $\frac{50}{70}$ of 84 lemons, which are 60 lemons, worth 60 times 2 cents, or \$1,20, value of 1 pound of tea.

70	50	5
	84	12
		2
		\$1,20. *Ans.*

(53)

\$1,18$\frac{2}{3}$, amount of \$1 for 2*yr.* 8*mo.* at 7 per cent.; \$500÷1,18$\frac{2}{3}$=\$421,348+, present value; 500−421,348=\$78,652+ discount. *Ans.*

(54)

The interest on \$1 for 4$\frac{1}{2}$ years would be \$91,125÷225=\$0,405, and for 1 year it would be .405÷4$\frac{1}{2}$=\$0.09; the interest on \$640 for 1 year would be 640×.09=\$57,60, and for 2$\frac{1}{4}$ years it would be 57,60×2$\frac{1}{4}$=\$129,60. *Ans.*

(55)

1000×1,75=\$1750, cash value; 1000×1,80=\$1800, time value; the amount of \$1750 for 90 days, at 7 per cent., would be \$1780,625; 1800−1780,625=\$19,375. Most advantageous to sell on time.

(56)

1575÷1,045=\$1507,177+, cash value of the goods.
1800−1507,177=\$292,823 gain. *Ans.*

(57)

Let 1 represent C's, then $\frac{5}{6}$ would equal B's, and $\frac{3}{4}$ of $\frac{5}{6}$=$\frac{5}{8}$ would equal A's; $1+\frac{5}{6}+\frac{5}{8}=\frac{24}{24}+\frac{20}{24}+\frac{15}{24}=\frac{59}{24}$, therefore they are all to have 59 shares, of which A is to have 15, B 20, and C 24; \$482,62÷59=\$8,18; 8,18×15=\$122,70 A's; 8,18×20=\$163,60 B's; 8,18×24=\$196,32 C's.

(58)

$\frac{1}{4}+\frac{1}{5}=\frac{9}{20}$, what A and B had; $1-\frac{9}{20}=\frac{11}{20}$ remainder, what C and D had; now if C had 5 as often as D 6, then C had $\frac{5}{11}$ and D $\frac{6}{11}$ of $\frac{11}{20}$, which gives C $\frac{1}{4}$ and D $\frac{3}{10}$ of the whole. Then A must have $\frac{1}{4}$, B $\frac{1}{5}$, C $\frac{1}{4}$, and D $\frac{3}{10}$ of \$9268,60=\$2317,15 A's; \$1853,72 B's; \$2317,15 C's; \$2780,58 D's.

(59)

5+5+7+8=25 parts all would pay; therefore, A paid $\frac{5}{25}$ of \$475,50=\$95,10; B $\frac{5}{25}$=\$95,10; C $\frac{7}{25}$=\$133,14, and D $\frac{8}{25}$=\$152,16.

(60)

1000×16×35=56000 ounces, whole amount of bread; 1000+400=1400 men; 56000÷1400=400 ounces for 1 man 56 days; 400÷56=$7\frac{1}{7}$ ounces per day.

(61)

The first will fill $\frac{1}{10}$ of it in 1 day; the second $\frac{1}{16}$ in 1 day; the third will empty $\frac{1}{20}$ of it in 1 day; $\frac{1}{10}+\frac{1}{16}=\frac{13}{80}$ that both will fill in 1 day; $\frac{13}{80}-\frac{1}{20}=\frac{9}{80}$, what will remain in; $1\div\frac{9}{80}=8\frac{8}{9}$ days to fill it.

(62)

536÷2=268 yards distance between them; 34÷3=$11\frac{1}{3}$ yards, the distance B goes in a minute; $11\frac{1}{3}-11=\frac{1}{3}$ yards what B gains upon A in 1 minute. It will take him as many minutes to gain 268 yards, or to overtake A, as $\frac{1}{3}$ is contained times in 268, which will be 804 minutes, and as he travels $11\frac{1}{3}$ yards per minute in 804 minutes, he will travel 804 times $11\frac{1}{3}$=9112 yards; 9112÷536=17 times around the wood.

(63)

One man can do $\frac{1}{10}$ of the work in 1 day, the other $\frac{1}{16}$, and the boy $\frac{1}{20}$; $\frac{1}{10}+\frac{1}{16}+\frac{1}{20}=\frac{17}{80}$, and it will take them as many days to do the whole as $\frac{17}{80}$ is contained times in 1; $1\div\frac{17}{80}=4\frac{12}{17}$ days.

(64)

$150 for 3 months is the same as $1 for 450 months; $175 for 6 months, the same as $1 for 1050 months; $175 for 8 months; the same as $1 for 1400: 450+1050+1400=2900 months; $500 would require $\frac{1}{500}$ as much time as $1; 29000 ÷500=5*mo.* 24*da.* *Ans.*

(65)

$$\left.\begin{matrix}42\\270\\8\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}63\\x\\11\frac{1}{3}\end{matrix}\right\} :: \left\{\begin{matrix}98\frac{3}{4}\\7\frac{1}{2}\\2\frac{1}{2}\end{matrix}\right. : \left\{\begin{matrix}45\frac{1}{3}\\6\frac{7}{12}\\3\frac{1}{8}\end{matrix}\right.$$

(66)

21 gallons plus $\frac{1}{3}$ of the whole equals $\frac{1}{2}$ of the cask; then $1-(\frac{1}{3}+\frac{1}{2})=\frac{1}{6}$, which must be equal to 21 gallons; 21 is $\frac{1}{6}$ of 6 times 21=126*gal.* *Ans.*

395	4
15	2
5	2
63	42
34	3
	270
2	17
3	136
12	79
8	25
x	

68

68 days. *A.*

(67)

The interest on the bond and mortgage being paid annually, the first settlement is made July 1st, 1855.

The interest is then computed on the bond and mortgage, and also on the several sums that have been drawn out and paid for stocks, and the difference in the amounts will show what is then due on the bond and mortgage.

Sept. 1st, 1854, 10 shares at 115=$1150 on interest 10 *mo.*
Nov. 1st " 8 " 98=$ 784 " " 8 "
April 1st 1855, 5 " 98=$ 490 " " 3 "

Amount of $1150 for 10 months,	$1217,083+
" $ 784 for 8 "	820,586+
" $ 490 for 3 "	498,575+
Cost of stocks, July 1st, 1855=	$2536,244+
Amount of bond and mortgage, July 1st, 1855,	$2675
Amount due on mortgage,	$138,755=

Amount of dividend on $1934, made Feb. 1st, 1855, with interest to the time of final settlement, Jan. 1st, 1856= - - - - - - - - $82,373

Amount of dividend on $2424, made Aug. 1st, 1855, with interest to Jan. 1st, 1856, - - $99,792

Amount of dividends, with interest, - - $182,165

Amount of $138,755, from July 1st, 1855, to Jan. 1st, 1856, $143,612; $99\times23=\$2277$, what he sold the stocks for; $2277+182,165+143,612=\$2602,777$, the amount he would have, Jan. 1st, 1856, by investing in stocks; $2675, the amount he would have on bond and mortgage; $62,223+ difference, and more profitable in bond and mortgage.

(68)

He receives 91 cents on a dollar, after deducting for taxes and repairs; therefore, $3014,30 must be 91 per cent. of what he first receives; $3014,30\div.91=\$3312,417+$. *Ans.*

(69)

$\$16,50\div165=.10$ cents, the cost per pound; $36\times.10=\$3,60$, the cost of 36 pounds; $390\times.10=\$39$, what he must sell 390 pounds for to get the cost; $\$390+3,60=\$42,60$, what he must sell it for to gain the price of 36 pounds.

(70)

$\$406\div10=40.6$ cubic yards, the volume; the volume of a body, divided by any two dimensions, will give the third; $(40.6\div14.5)\div.7=4yd.$ the height.

(71)

$7-5=2$ miles, what he gains in 1 hour; it will take him as many hours to gain 40 miles as 2 is contained times in $40=20$ hours; $20\times7=140$ miles that he must travel.

(72)

The first family was equivalent to $4\frac{1}{2}$ grown persons, and the second to 9; $4\frac{1}{2}$ persons in 2 weeks would consume as much as 1 person in 9 weeks, and 9 persons in 3 weeks as much as 1 person in 27 weeks; both families would consume the same as 1 person in 36 weeks; therefore, the first must pay $\frac{9}{36}=\frac{1}{4}$ of $\$8=\$2$; and the second $\frac{27}{36}=\frac{3}{4}$ of $\$8=\$6$.

(73)

$33A.\ 2R.\ 16P.=33.6A.$; $33.6\times125=\$4200$, value of the land; $4200\div42=100$ thousand feet of lumber.

(74)

$2\frac{1}{2}$ acres reduced to feet equals 108900 square feet; $100\times50=5000$ square feet; $108900\div5000=21\frac{9}{50}$ lots.

(75)

$\$150\div.0375=\$4000$, the amount insured, including premium of \$150, and \$25 besides; $150+25=\$175$; $4000-175=\$3825$, value of the goods.

(76)

$5000\times.96=\$4800$, cash value of the rye; the amount of \$4800 for 2 months, at 7 per cent., would be \$4856; $5000-4856=\$144$ more advantageous to borrow the money and pay cash.

(77)

$\frac{1}{6}$ of $\frac{2}{3}=\frac{1}{9}$; $\frac{2}{3}-\frac{1}{9}=\frac{5}{9}$ of the capital; $\$25000-5000=20000$, the par value of $\frac{5}{9}$ the whole capital; $(20000\div5)\times9=\$36000$, the whole capital.

(78)

$3ft.\ 5in.=41in.$; $2ft.\ 6in.=30in.$; $6ft.=72in.$; $41\times30\times72=88560$ cubic inches = the volume of the bin; 88560, divided by 2150,4, the number of cubic inches in a bushel, gives 41.13+ bushels.

(79)

The perpendicular line would divide the given triangle into two right-angled triangles, with the perpendicular $45ft.$ common, and the hypothenuse of one $75ft.$, and the hypothenuse of the other $90ft.$; to find the base of each, the sum of which will be the required side of the given triangle ; $(75)^2-(45)^2=3600$; $\sqrt{3600}=60ft.$; $(90)^2-(45)^2=6075$; $\sqrt{6075}=77.942ft.$; $77.942+60=137.942+ft.$ *Ans.*

(80)

It will take the first 90 days to travel 2160 miles ; the second 80 days, and the third 72 days ; therefore, the second must leave 10 days after the first, and the third, 8 days after the second, or 18 days after the first.

(81)

The house did not give a profit of \$420 by \$130 ; $420-130=\$290$, actual profit ; $7180-290=\$6890$, the purchase price.

(82)

The two companies consisted of 47 men ; hence, the first cleared $\frac{25}{47}$, and the second $\frac{22}{47}$ of of 188 acres, or the first cleared 100 acres, and the second 88 acres ; as the first company contained 3 more men than the second, \$84 must be $\frac{3}{47}$ of the whole cost of clearing ; $(84\div3)\times47=\$1316$, whole cost ; $1316\div188=\$7$ per acre, cost of clearing.

(83)

Find the equated time from the time the first note falls due.

			days.
Due Feb.	12th,	1856,	$100\times0=00000$
" March	12th,	"	$400\times28=11200$
" April	1st,	"	$300\times48=14400$
			$800 \quad 25600(32$ days.

The average time would be 32 days from Feb. 12, 1856, or on the 16th day of March.

(84)

$32\times25\times144=115200sq.\ in.$, area of the floor; $15\times15=225sq.\ in.$, area of a slab; $115200\div225=516\frac{4}{9}$ slabs; $(32\times25)\div9=88\frac{8}{9}sq.\ yd.$, area of floor; $88\frac{8}{9}\times3{,}40=\$302{,}22\frac{2}{9}$, whole cost.

(85)

$500+425+300+250+175=\$1650$, amount of bequests.

$1650 : 500 :: 1155 : x=\$350$ A's.
$1650 : 425 :: 1155 : x=\$297{,}50$ B's.
$1650 : 300 :: 1155 : x=\$210$ C's.
$1650 : 250 :: 1155 : x=\$175$ D's.
$1650 : 175 :: 1155 : x=\$122{,}50$ E's.

(86)

If $27lb.$ of soap is worth $18lb.$ of sugar, $1lb.$ of sugar is worth $\frac{1}{18}$ of $27=\frac{27}{18}lb.$ of soap; $48lb.$ of sugar will be worth 48 times as much; $\frac{27}{18}\times48=72lb.$ of soap, or $14lb.$ of coffee; $1lb.$ of coffee will be worth $\frac{1}{14}$ of $72lb.$ of soap $=\frac{36}{7}lb.$ of soap, and $7lb.$ of coffee will be worth 7 times $\frac{36}{7}=36lb.$ of soap, or $3lb.$ of tea; $1lb.$ of tea will be worth $\frac{1}{3}$ of $36lb.$ of soap $=12lb$, and $6lb.$ of tea will be worth 6 times $12=72lb.$ of soap.

~~18~~	~~27~~ 9
~~14~~	~~48~~ 8
~~3~~	~~7~~
	~~6~~
	$72lb.$ *Ans.*

(87)

Let 1 or $\frac{5}{5}$ represent the time to midnight, then $\frac{4}{5}$ will represent the time past noon, and $\frac{5}{5}+\frac{4}{5}=\frac{9}{5}$ the whole time from noon to midnight; if 12 hours be $\frac{9}{5}$, $\frac{1}{9}$ of 12 hours would be $\frac{1}{5}=\frac{1}{9}$ of $12=1\frac{1}{3}$ hours, $\frac{4}{5}$ of the time past noon would be 4 times $1\frac{1}{3}hr.$ $=5\frac{1}{3}hr.=5$ o'clock and 20 minutes, P. M.

(88)

1 yard in length will cost $\frac{4}{3}$ as much as $\frac{3}{4}yd.$, and 1 yard in width $\frac{8}{7}$ as much as $\frac{7}{8}yd.$ wide; $\frac{5}{8}$ of a yard will cost $\frac{5}{8}$ as much as 1 yard in length, and $1\frac{3}{4}yd.$ wide $\frac{7}{4}$ as much as 1 yard wide.

~~5~~	~~2~~
~~3~~	~~4~~
~~7~~	~~8~~
~~8~~	~~5~~
~~4~~	~~7~~
3	$2=\$\frac{2}{3}$. *Ans.*

(89)

If he had bought all turkeys they would have cost him \$66; but as he paid only \$51,60, he saved \$14,40 by buying a part chickens; and as he would save the difference between \$1,10 and 50 cents in buying 1 chicken, so he must buy as many chickens as 60 cents is contained times in \$14,40=24 chickens; 60—24=36 turkeys.

(90)

6+4+3=13 shillings, what he paid to them for 1 day's work; for 104 shillings he could employ them as many days as 13 is contained times in 104=8 days. *Ans.*

(91)

5+6+7=\$18; then the first must have $\frac{5}{18}$, the second $\frac{6}{18}$, and the third $\frac{7}{18}$ of \$6471: hence, \$1797,50, the first; \$2157, the second; and \$2516,50, the third.

(92)

1600+300=\$1900, whole stock and gain. Now, the gain of the first will bear the same relation to the whole gain as his stock and gain do to the whole stock and gain—or 1900 : 1140 : : 300 : x=\$180, the gain of the first; 1140—180=\$960, the stock of the first; 1600—960=\$640, the stock of the second; and 300—180=\$120, the gain of the second.

(93)

$(3 \div 4.45) \times 75.75 = 49.945+$ feet. *Ans.*

(94)

A can do $\frac{1}{3}$ of the work in 1 week; if B can do 3 times as much in 8 weeks, he can do A's work in $\frac{8}{3}$ of a week, and in 1 week $\frac{3}{8}$ of it; if C can do 5 times as much in 12 weeks, he can do A's work in $\frac{12}{5}$ of a week, and in 1 week $\frac{5}{12}$ of it; $\frac{1}{3}+\frac{3}{8}+\frac{5}{12}=\frac{24}{24}=\frac{9}{8}$ what all will do in 1 week; since they can do $\frac{9}{8}$ of the work in 1 week, they will do $\frac{1}{8}$ of the work in $\frac{1}{9}$ of 1 week, and to do the whole or $\frac{8}{8}$ will require 8 times $\frac{1}{9}$ of 1 week=$\frac{8}{9}$ of a week. *Ans.*

(95)

$11\frac{1}{2}\times 4=46mi.$; the first is $46mi.$ in advance when the second passes the point; $17\frac{1}{2}-11\frac{1}{2}=6$ miles, the second gains upon the first in 1 hour; it will require as many hours to overtake him as 6 is contained times in $46=7\frac{2}{3}$ hours; $7\frac{2}{3}+4=11\frac{2}{3}$ hours, the first will travel; $11\frac{1}{2}\times 11\frac{2}{3}=134\frac{1}{6}$ miles, the distance the first will travel.

(96)

$120+400+100=\$620$, whole gain; the whole gain will be to each one's gain, as the whole stock multiplied by the time, is to each one's stock multiplied by the time it was in trade, which, divided by the time, will give the original stock.

620 : 120 : : (1600 × 6) : $x=\$1858,064+$;

$1858,0640\div 6=\$\ 309,677+$ A's.

620 : 400 : : (1600 × 12) : $x=\$12387,096+$;

$12387,096\div 12=\$1032,258+$ B's.

620 : 100 : : (1600 × 15) : $x=\$\ 3870,967+$;

$3870,967\div 15=\$\ 258,064+$ C's.

Proof, $\$\ 1600,00$

(97)

First find the number of days that it would take each to travel around it, by dividing the circumference by the number of miles each travels per day; it would take A $12\frac{1}{6}$, B $7\frac{3}{10}$, and C $4\frac{9}{16}$ days; find the least common multiple of these three numbers, which will be the time that they will all be together again, which is $36\frac{1}{2}$ days. *Ans.*

(98)

$(2)^3\times 1728=13824$ *c. in.*, volume of the cube; 13824 less 10 per cent. $=12441.6$ *c. in.*, to be drawn into wire; $(\frac{1}{8})^2\times 7854=.0122656$, area of the base of the cylinder of wire; $12441.6\div .0122656=1013533.78+$ inches, length of wire = 84461.14 feet.

(99)

$10000 at 6 per cent. yields $600. Sold out at 65 per cent., giving $6500 : this, invested at 82½ per cent., gives 6500 ÷ .825 = $7878,787, the interest on which, at 5 per cent., is $393,939 ; hence, the difference, $206,061, is in favor of the 1st investment.

(100)

$46\frac{1}{2} \times 8 \times 2\frac{3}{5} = 967.2$ *c. yd.*, what would take one boat through; $365 - (52+8) = 305$ days in the year; $40+40 = 80$ boats per day ; $967.2 \times 80 \times 305 = 23599680$ *c. yd.* *Ans.*

(101)

$365 \times 22 \times 64 = \$513920$, whole amount of tolls ; $22 \times 5 \times 66 = \$7260$, expenses ; $513920 - 7260 = \$506660$, whole tolls ; $506600 - 200000 = 305660$; $305660 \div 66 = \$4646,363$. *Ans.*

(102)

mo.

$60 \times 48 = 2880$
$800 \times 43 = 34400$
37280 1st.

$600 \times 48 = 28800$
$1800 \times 42 = 75600$
104400 2d.

$400 \times 48 = 19200$
$500 \times 42 = 21000$
$500 \times 36 = 18000$
$500 \times 30 = 15000$
$500 \times 24 = 12000$
$500 \times 18 = 9000$
$500 \times 12 = 6000$
$500 \times 6 = 3000$
103200 3d.

$900 \times 40 = 36000$
$900 \times 34 = 30600$
$900 \times 28 = 25200$
$900 \times 22 = 19800$
$900 \times 16 = 14400$
$900 \times 10 = 9000$
$900 \times 4 = 3600$
138600 4th.

$800 \times 48 = 38400$
$800 \times 36 = 28800$
$800 \times 24 = 19200$
$800 \times 12 = 9600$
96000 5th.

37280
104400
103200
138600
96000
479480 whole stock.

479480 : 37280 : : 20000 : x = $1555,017+ 1st.
479480 : 104400 : : 20000 : x = $4354,717+ 2d.
479480 : 103200 : : 20000 : x = $4304,663+ 3d.
479480 : 138600 : : 20000 : x = $5781,263+ 4th.
479480 : 96000 : : 20000 : x = $4004,338+ 5th.

(103)

44+49=93, the number of men it would require to increase the square by 1 man on a side; deducting 1 for the man occupying the corner, and dividing by 2 we have the number of men on one side of the square; $(93-1)\div 2=46$; $(46)^2=2116$ = the number of men in the square first formed; 2116+44= 2160 men in the army.

(104)

$\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}=\frac{20}{60}$, $\frac{15}{60}$, $\frac{12}{60}$; then $100 must be divided into 47 shares, of which A has 20, B 15, and C 12, or $\frac{20}{47}$, $\frac{15}{47}$, and $\frac{12}{47}$ of $100; but by C's death, A and B's shares are increased in the ratio of 20 to 15, so that A's share will be increased by $\frac{20}{35}$ of $\frac{12}{47}$, which added to $\frac{20}{47}=\frac{188}{329}$; and B's will be increased by $\frac{15}{35}$ of $\frac{12}{47}$, which added to $\frac{15}{47}=\frac{141}{329}$, giving A $57,142, and B $42,857.

(105)

When she left the last place she had $3, which was $\frac{1}{2}$ a dollar less than $\frac{1}{2}$ she had when she came to the last place; then, $3\frac{1}{2}$ is one-half of 2 times $3\frac{1}{2}=\$7$, what she had when she left the second place, which was $\frac{1}{2}$ a dollar less than $\frac{1}{2}$ she had when she came to the second place; then $7\frac{1}{2}$ is one-half of 2 times $7\frac{1}{2}=\$15$, what she had when she left the first place, which was $\frac{1}{2}$ a dollar less than $\frac{1}{2}$ she had when she came to the first place; then $15\frac{1}{2}$ is one-half of 2 times $15\frac{1}{2}=\$31$, what she started with.

(106)

Let 1 denote the quantity of fluid discharged by the first pipe in 4 hours, then $\frac{1}{4}$ will be the quantity discharged in 1 hour; but the quantities discharged are as the areas of their sections, and therefore as the squares of their diameters; hence,

$6^2 : 3^2 :: \frac{1}{4} : x = \frac{1}{16}$, what 1 of the smaller pipes will discharge in 1 hour; 4 pipes will discharge 4 times as much $= \frac{1}{4}$; therefore the 4 smaller pipes will discharge as much in 1 hour as the larger; and to discharge 2 times as much in 4 hours, would require $4 \times 2 = 8$ hours. *Ans.*

(107)

$(370 - 40) \div (12 - 1) = \$30$, common difference.

$(370 + 40) \times 6 = \$2460$, whole cost.

(108)

$297{,}60 + 321{,}92 + 375{,}83 + 402{,}50 = \$1397{,}85$, but as the amount each paid is named 3 times, $1397{,}85 \div 3 = \$465{,}95$, the actual sum paid by the 4 persons; subtracting what any three paid from the whole amount, and the remainder will be what the fourth paid.

$465{,}95 - 321{,}92 = \$144{,}03$, A's.
$465{,}95 - 375{,}83 = \$\ 90{,}12$, B's.
$465{,}95 - 402{,}50 = \$\ 63{,}45$, C's.
$465{,}95 - 297{,}60 = \$168{,}35$ D's.

(109)

£3000 at $7\frac{1}{2}$ per cent. = \$14333,333
£3000 at par = 13333,333
The premium = diff. \$1000

What amount of 4 months' receivables (including grace) must be sold when the rate of discount is 12 per cent. to pay for \$14333,33 worth of Exchange?

The interest of \$1.00 for 4*mo.* 3*da.* at 12 per cent. $=.041$; and $1.00-.041=.959$. Then, $.959 : 1.00 :: 14333,33 : 14946,02$ = amount of receivables used in the transaction.

2*d.* What is the amount and rate of premium when the notes for it, are at 6 months, and 10 per cent. discount?

First, $.0508\frac{1}{3}=$ interest on \$1.00 for 6*mo.* 3*da.* at 10 per cent., and $\$1.00-.0508\frac{1}{3}=.9491\frac{2}{3}$; hence, we have $1.00 : .9491\frac{2}{3} :: 14946,02 : \$14186,264=$ what must be paid for £3000 at the required premium; and $14186,264-13333,333=\$852,931=$ the required premium. Now, as \$1000 constituted the premium when the rate was $7\frac{1}{2}$ per cent., it is evident that when the premium is less, the rate of that premium will also be less. Therefore, $1000 : 852,931 :: .075 : .06397=$ the required rate.

(110)

$15000\div3=\$5000$, equal payment.

$5000\div1,02\frac{1}{3}=\$4885,9934+$ present value.
$5000\div1,035=\$4830,9178+$ " "
$5000\div1,0525=\$4750,5938+$ " "
\$14467,505 present value of purchase.

(111)

$$\left.\begin{matrix}60\\2\frac{1}{2}\\1\frac{3}{4}\end{matrix}\right\} : \begin{matrix}84\\3\\2\frac{1}{4}\end{matrix} :: 45 : x.$$

$$\begin{array}{r|l} \cancel{60} & \cancel{45} \\ & \cancel{84} \\ & 3 \\ \cancel{4} & 9 \\ 5 & 2 \\ \cancel{7} & \cancel{4} \\ \hline 5 & 486 \\ \hline & 97\frac{1}{5}\,lb. \end{array}$$ *Ans.*

(112)

The eggs cost $\frac{3}{4}$ of a cent each, and were sold for $\frac{4}{5}$ of a cent each; $\frac{4}{5}-\frac{3}{4}=\frac{1}{20}$, the gain on 1 egg; $4\div\frac{1}{20}=80$ eggs, the number sold.

(113)

$\frac{1}{6}+\frac{1}{12}+\frac{1}{7}+\frac{1}{2}+5+4$ must equal the whole length of life; $\frac{1}{6}+\frac{1}{12}+\frac{1}{7}+\frac{1}{2}=\frac{75}{84}$, then 9 years must make up the whole $1-\frac{75}{84}=\frac{9}{84}$, or the 9 years of his life, from which we readily find his age to be 84 years.

(114)

Find the volume of two cylinders, each 40 feet in length, and one 6*ft.* 6*in.* in diameter, and the other 3*ft.* 6*in.*, and the difference in volume will be the contents of the wall.

6*ft.* 6*in.* = 78*in.*; $(78)^2 \times .7854 = 4778.3736$ *sq. in.* surface; 4778.3736×480*in.* = 2293619.328 *c. in.*; $2293619.328 \div 1728 = 1327.326$ *c. ft.*; 3*ft.* 6*in.* = 42; $(42)^2 \times .7854 = 1385.4456$ *sq. in.* surface.

1385.4445×480*in.* = 665013.888 *c. in.*; $665013.888 \div 1728 = 384.2672+$ *c. ft.*; $1327.326 - 384.2672 = 943.0587+$ *c. ft.*, contents of the wall.

(115)

100 links = 1 chain; 16 links = $\frac{16}{100}$ chain.

$42.16 \times 37 = 1559.92$ *sq. ch.* = 155.992 acres

= 155*A.* 3*R.* 38.72*P.* *Ans.*

(116)

A, B and C did $\frac{4}{10}$ of the work in 4 days, B and C $\frac{3}{10}$ in 5 days, and C $\frac{3}{10}$ in $11\frac{1}{4}$ days. In 1 day C will do $\frac{2}{75}$ of the work, and it will take him as many days to do the whole work as $\frac{2}{75}$ is contained times in 1, which is $37\frac{1}{2}$ days.

B and C can do $\frac{3}{50}$ of the work in 1 day, $\frac{3}{50}-\frac{2}{75}=\frac{1}{30}$ what B can do alone in 1 day, and it will take him as many days to do the whole work as $\frac{1}{30}$ is contained times in 1, which is 30 days.

A, B and C can do $\frac{1}{10}$ of the work in 1 day; $\frac{1}{10}-\frac{3}{50}=\frac{2}{50}$ what A can do in 1 day, and it will take him as many days to do the whole work as $\frac{2}{50}$ is contained times in 1, which is 25 days. Then it will take A 25 days, B 30 days, and C $37\frac{1}{2}$ days.

(117)

Find the present worth of \$1 for 1, 2, 3, 4 and 5 years respectively, giving \$0.93457943+, \$0.87719298+, 0.82644628+, \$0.78125, \$0.74074074+; the sum of these will be \$4,16020943+, which is the amount to be divided in such a manner that the quotients shall denote the parts of \$1 of the principal, which, according to the conditions of the question, must be paid each year, and which, put at interest at 7 per cent., will produce \$1, or equal amounts at the end of their respective times. Then there must be paid 1500 like parts of \$1 of the principal, for each year resectively, which, put at interest as above stated, will give equal amounts.

$$\$0.93457943 \div 4.16020943 \times 1500 = \$336.9705.$$
$$\$0.87719298 \div 4.16020942 \times 1500 = \$316.2795.$$
$$\$0.82644628 \div 4.16020943 \times 1500 = \$297.9810.$$
$$\$0.78125000 \div 4.16020943 \times 1500 = \$281.6850.$$
$$\$0.74074074 \div 4.16020943 \times 1500 = \$267.0795.$$

The above parts of the principal, if put at interest at 7 per cent. for 1, 2, 3, 4 and 5 years respectively, will amount to equal sums, or \$360,56 nearly, which will be the annual payment.

(118)

A, B, C will fill $\frac{1}{6}$ in 1 hour; B, C, D, $\frac{1}{8}$; C, D, A, $\frac{1}{10}$; and D, A, B, $\frac{1}{12}$; $\frac{1}{6}+\frac{1}{8}+\frac{1}{10}+\frac{1}{12}=\frac{57}{120}$, and because the amount poured in by each pipe has been named 3 times, we divide $\frac{57}{120}$ by $3=\frac{19}{120}$, what the 4 pipes will fill in 1 hour; E, F, G will empty $\frac{1}{6}$ in 1 hour, F, G, H, $\frac{1}{5}$; G, H, E $\frac{1}{4}$; and H, E, F, $\frac{1}{3}$; $\frac{1}{6}+\frac{1}{5}+\frac{1}{4}+\frac{1}{3}=\frac{57}{60}$, and because the amount each pipe empties is named 3 times, we divide $\frac{57}{60}$ by $3=\frac{19}{60}$, what the 4 pipes will empty in 1 hour; $\frac{19}{60}-\frac{19}{120}=\frac{19}{120}$ of the whole fountain will be emptied in 1 hour; it will take as many hours to empty the fountain as $\frac{19}{120}$ is contained times in 1, which is $6\frac{6}{19}$ hours.

(119)

$60\frac{1}{2} \times 33\frac{1}{2} \times 144 = 291852 sq.\ in.$, area of the floor

$15 \times 12 \times 15 = 2700 sq.\ in.$, area of 1 plank.

$291852 \div 2700 = 108\frac{7}{75}$ planks. *Ans.*

(120)

Since the weights of similar bodies are in the same ratio as their volumes, and therefore as the cubes of their diameters, hence,

$$5 : 78.125 : : 2^3 : x^3 = 125 ; \sqrt[3]{125} = 5 \text{ inches.}$$

(121)

Payment April 1st, 1853, with 1 year's interest,		$535,00
" " 1853, without " - -		500,00
Present value of payment for	1854 =	466,75+
" " "	1855 =	435,72+
" " "	1856 =	406,75+
" " "	1857 =	379,71+
" " "	1858 =	354,47+
" " "	1859 =	330,90+
" " "	1860 =	308,89+
" " "	1861 =	288,35+
Present value of the whole on the 1st of April, 1853,		$4006,54+

MENSURATION.

(2)

$(60 \times 12) \div 2 = 360 sq.\ ch.$; $360 \div 10 = 36$ acres.

(3)

$(45 \times 38) \div 2 = 855 sq.\ rd. = 5A.\ 1R.\ 15P.$ *Ans.*

(4)

$(75 \times 36) \div 2 = 1350 sq.\ ch. = 135$ acres.

(1)

$(66.16 \times 66.16) \div 10 = 437.71456$ acres $= 437A.\ 2R.\ 34P+.$

(2)

$(54 \times 54) \div 10 = 291.6$ acres $= 291A.\ 2R.\ 16P.$ *Ans.*

(3)

$75 \times 75 = 5625 sq.\ rd. = 35A.\ 0R.\ 25P.$ *Ans.*

(4)

$80 \times 40 = 3200 sq.\ rd. = 20A.$ *Ans.*

(5)

$80 \times 80 = 6400 sq.\ rd. = 40A.$ *Ans.*

(6)

$(30 \times 5) \div 10 = 15A.$ *Ans.*

(7)

$54\ ch. \times 4 = 216 rd.$; $216 \times 18 = 3888 sq.\ rd. = 24A.\ 1R.\ 8P.$

(8)

$720 ft. = 240 yd.$; $542 \times 240 = 130080 sq.\ yd. = 27A.\ 0R.\ 16P.$

(2)

$(24.82 + 16.44) \times 10.30 \div 2 = 21.2489$ acres
$= 21A.\ 0R.\ 39.824P.$ *Ans.*

(3)

$(51 + 37\frac{1}{2}) \times 20\frac{5}{8} \div 2 = 921{,}875 sq.\ ft.$ *Ans.*

(4)

$(24.5 + 41) \times 21.5 \div 2 = 704.125 sq.\ yd.$ *Ans.*

(5)

$(24.5+15)\times 30.80)\div 2=608.3$ *sq. ch.* $=60A.\ 3R.\ 12.8P.$ *Ans.*

(6)

$(40+64)\times 52\div 2=2704$ *sq. ch.* $=270A.\ 1R.\ 24P.$ *Ans.*

(2)

$186\times 3.1416=584.3376.$ *Ans.*

(3)

$40\times 3.1416=125.664.$ *Ans.*

(4)

$57\times 3.1416=179.0712.$ *Ans.*

(2)

$23304.3888\div 3.1416=7418.$ *Ans.*

(3)

$13700\div 3.1416=4360.835+.$ *Ans.*

(2)

$(5)^2\times .7854=19.635.$ *Ans.*

(3)

$(14)^2\times .7854=153.9384.$ *Ans.*

(4)

$(3.5)^2\times .7854\div 9=1.069016+$ *sq. yd.* *Ans.*

(2)

$(14)^2\times 3.1416=615.7536.$ *Ans.*

(3)

$(36)^2\times 3.1416=4071.5136.$ *Ans.*

(4)

$(7918.7)^2 \times 3.1416 = 196996571.722104$ *sq. mi.* *Ans.*

(2)

$(8^2 \times 3.1416 \times 8) \div 6 = 268.0832$ volume. *Ans.*

(3)

$((16)^2 \times 3.1416 \times 16) \div 6 = 2144.6656$ volume. *Ans.*

(4)

$((7918.7)^2 \times 3.1416 \times 7918.7) \div 6 = 259992792079.869+$. *A.*

(5)

$(12^2 \times 3.1416 \times 12) \div 6 = 904.7808$. *Ans.*

(1)

$35 \times 5 \times 52 = 9100$ *sq. ft.* *Ans.*

(2)

$15 \times 8 \times 12 = 1440$ *sq. ft.*

(2)

$48 \times 48 \times 48 = 110592$ *c. in.* *Ans.*

(3)

3*ft.* 2*in.* $\times$ 2*ft.* 8*in.* $\times$ 5*ft.* $= 42\frac{7}{9}$ *c. ft.* *Ans.*

(4)

$1728 \times 42\frac{7}{9} = 72960$ *c. in.*, volume of the cistern.
$72960 \div 231 = 315\frac{45}{77}$ gallons. *Ans.*

(5)

$691 \times 20 = 13820$ *c. ft.* *Ans.*

(2)

$8\frac{1}{3} \times 3.1416 \times 28 = 233.33\frac{1}{3}$ *sq. ft.* *Ans.*

(3)

$5 \times 3.1416 \times 60 = 2827.44$ *sq. in.* *Ans.*

(4)

$40 \times 3.1416 \times 50 = 6283.2$ *sq. ft.* *Ans.*

(2)

$(40)^2 \times .7854 \times 29 = 36442.56$. *Ans.*

(3)

$(24)^2 \times .7854 \times 30 = 13571.712$. *Ans.*

(4)

$(32)^2 \times .7854 \times 12 = 9650.9952$. *Ans.*

(5)

$(25)^2 \times .7854 \times 15 = 7363.125$. *Ans.*

(2)

$(365 \times 36) \div 3 = 4380$. *Ans.*

(3)

$(207 \times 36) \div 3 = 2484$. *Ans.*

(4)

$(562 \times 30) \div 3 = 5620$. *Ans.*

(5)

$(540 \times 32) \div 3 = 5760$. *Ans.*

(6)

$(50 \times 24 \times 36) \div 3 = 14400$. *Ans.*

(7)

$(15\times15\times24)\div3=1800$. *Ans.*

(2)

$((36)^2\times.7854\times27)\div3=9160.9056$. *Ans.*

(3)

$((35)^2\times.7854\times27)\div3=8659.035$. *Ans.*

(4)

$((20)^2\times.7854\times27)\div3=2827.44$ *Ans.*

GAUGING.

(2)

$26\div38=68\frac{8}{17}$; $8551\times38=32.4938in.$ mean diameter.

(3)

$22\div34=64\frac{12}{17}$; $8311\times34=28.2574in.$ mean diameter.

(1)

$30\div36=83\frac{1}{3}$; $.9467\times36=34.0812$; $(34.0812)^2\times50\times34=197.459+$ gallons of wine.

(2)

$(34.0812)^2\times50\times28=162.613+$ gallons of beer.

(3)

$30\div35=85.7$; $.9556\times36=34.401$ mean diameter.

$(34.401)^2\times36\times34=144.856+$ gallons of wine.

$(34.401)^2\times36\times28=119.293+$ gallons of beer.

(4)

$24\div36=66\frac{2}{3}$; $.8954\times36=32.234$ mean diameter.

$(32.234)^2\times42\times34=149.23+$ gallons of wine.

MECHANICAL POWERS.

(1)

$1 : 1 : : 40 : x = 40$ pounds. *Ans.*

(2)

The distance from the power to the fulcrum is 2 times that of he weight.

$2 : 1 : : 50 : x = 25$ pounds. *Ans.*

(3)

$1 : 2 : : 25 : x = 50$ pounds. *Ans.*

(4)

$6 : 2 : : 60 : x = 20$ pounds. *Ans.*

(5)

$5 : 1 : : 200 : x = 40$ pounds. *Ans.*

(6)

$1 : : 1 : x = 1in.$; $1 \times 1\frac{1}{2} = 1\frac{1}{2}in.$; $1 \times 2 = 2in.$; $1 \times 4 = 4in.$

(7)

$5 : 8 : : 40 : x = 64$ pounds. *Ans.*

(8)

$8 : 12 : : 100 : x = 150$ pounds. *Ans.*

(1)

$60 \div 1 = 60$ pounds. *Ans.*

(2)

$80 \div 2 = 40$ pounds. *Ans.*

(3)

$100 \div 4 = 25$ pounds.

(1)

40 : 600 : : 6 : x=90*in.*=7½*ft.* *Ans.*

(2)

400 : 100 : : 6 : x=1½*ft.* *Ans.*

(1)

30 : 6 : : 200 : x=40 pounds. *Ans.*

(2)

10 : 20 : : 50 : x=100 pounds. *Ans.*

(3)

45 : 15 : : 180 : x=60 pounds. *Ans.*

(1)

2 : 12 : : 96 : x=576 pounds. *Ans.*

(2)

3 : 27 : : 250 : x=2250 pounds. *Ans.*

(1)

½ : 180 : : 720 : x=259200 pounds. *Ans.*

(2)

24×3.1416×12=904.7808*in.* circumference.

904.7808 : ⅓ : : 4000 : x=1.47+*lb.* *Ans.*

(3)

First get the power that will produce 10000*lb.* effort by the wedge; 30 : 2½ : : 10000 : x=833⅓*lb.*= to the weight sustained by the screw; 3.1416×20×12=753.9840*in.* circumence; 753.9840 : 1 : : 833⅓ : x=1.1+*lb.*

(4)

30×3.1416×12=1130.976 circumference.

282744 : 300 : : 1130.976 : x=1.21 inches.

UNIFORM MOTION.

(1)

$23 \times 5400sec. = 124200ft. = 23mi.\ 2760ft.$ *Ans.*

(2)

$32 \times 180sec. = 5760$ feet. *Ans.*

(3)

$5280^* \times 12 \div 6 = 10560sec. = 2hr.\ 56m.$ *Ans.*

(4)

$15 \times 5280 \div 2\frac{3}{4} \times 60 \times 60 = 8$ feet. *Ans.*

(5)

$35 \div 1\frac{1}{2} = 26\frac{2}{3}$ seconds. *Ans.*

(6)

$1000 \div 3\frac{3}{4} \times 60 = 4\frac{4}{9}$ feet. *Ans.*

(7)

The vessel has a start of $170 \times 4 = 680$ miles. It will take the clipper $680 \div (275 - 170) = 6da.\ 11\frac{3}{7}hr.$ to gain this distance by her superior sailing.

(8)

$100 \times 5280 \div 11 \times 60 \times 60 = 13\frac{1}{3}$ feet. *Ans.*

(9)

$1127 \times 31.3 = 35275.1ft. = 6mi.\ 3595.1ft.$ *Ans.*

(10)

$69\frac{1}{6} \times 3 \times 5280 \div 95 = 11532\frac{12}{19}sec. = 3hr.\ 12m.\ 12\frac{12}{19}sec.$ *Ans.*

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* Number of feet in 1 mile. See Table.

(11)

$95000000 \div 191300 = 496.6sec. = 8m.\ 16.6sec.$ *Ans.*

(12)

$2300 \div .14 = 16428.5$ miles = velocity of current.

LAWS OF FALLING BODIES.

(1)

$16\frac{1}{12} + 11 \times 32\frac{1}{6} = 369\frac{11}{12}$ feet.

$16\frac{1}{12} \times 144 = 2316$ feet.

(2)

$16\frac{1}{12} \times 15 \times 15 = 3618\frac{3}{4}$ feet.

$32\frac{1}{6} \times 15 = 482\frac{1}{2}$ feet.

(3)

The velocity $= \sqrt{2 \times 32\frac{1}{6} \times \text{height of fall}}$. Therefore, the 120 squared $= 2 \times 32\frac{1}{6} \times$ height of fall. Hence, height of fall $= 120 \times 120 \div 2 \times 32\frac{1}{6} = 223\frac{4}{5}$ feet. *Ans.*

(4)

$100 = 16\frac{1}{12} \times$ square of number of seconds. Therefore, number of seconds $= \sqrt{100 \div 16\frac{1}{12}} = 2\frac{1}{2}$ seconds, nearly.

(5)

$16\frac{1}{12} \times 100 = 1608\frac{1}{3}$ feet, the space.

$32\frac{1}{6} \times 10 = 321\frac{2}{3} =$ the velocity.

(6)

$1000 \times 1000 = 2 \times 32\frac{1}{6} \times$ height. Therefore, the height $= 1000000 \div 64\frac{1}{3} = 15544\frac{8}{193} ft. = 2mi.\ 4984\frac{8}{193} ft.$

(7)

$16\frac{1}{12} \times 3.2 \times 3.2 = 164.69$ feet. *Ans.*

(8)

$16\frac{1}{12} \times 2.5 \times 2.5 = 100.52$ feet. *Ans.*

(9)

$160 \times 160 = 2 \times 32\frac{1}{6} \times$ height. Therefore, height $= 160 \times 160 \div 64\frac{1}{3} = 397\frac{79}{193} ft.$; $160 = 32\frac{1}{6} \times$ time of ascent. Therefore, time of ascent $= 160 \div 32\frac{1}{6} = 4\frac{88}{193} sec.$

(10)

$32\frac{1}{6} \times 5 = 160\frac{5}{6} ft.$ = velocity of projection; $160\frac{5}{6} \times 160\frac{5}{6} = 64\frac{1}{3} \times$ height. Therefore, height $= 160\frac{5}{6} \times 160\frac{5}{6} \div 64\frac{1}{3} = 402\frac{193}{2316}$ feet.

(11)

$32\frac{1}{6} \times 45 = 1447.5$ feet. *Ans.*

(12)

$1970 = 32\frac{1}{6} \times$ time of fall. Therefore, number of seconds of fall $= 1970 \div 32\frac{1}{6} = 61.24 sec.$

(13)

$3280 = 16\frac{1}{12} \times$ number of seconds squared. Therefore, square of number of seconds $= 3280 \div 16\frac{1}{12} = 203.9377+$. Therefore, number of seconds $= \sqrt{203.9377} = 14.28+$.

(14)

$984 \times 984 = 2 \times 32\frac{1}{6} \times$ height. Therefore, height $= 984 \times 984 \div 64\frac{1}{3} = 15050\frac{118}{193}$ feet.

(15)

$386 = 32\frac{1}{6} \times$ number of seconds. Therefore, number of seconds $= 386 \div 32\frac{1}{6} = 12$: height $= 16\frac{1}{12} \times 12 \times 12 = 2316$ feet.

SPECIFIC GRAVITY.

(1)

$93-82\frac{1}{2}=10.5gr.$, weight of an equal volume of water.
$93\div 10.5=8.857=$ specific gravity.

(2)

A cubic foot of the oak must weigh 925 ounces. Therefore,
$925oz. : 2240\times 16oz. : : 1$ cubic foot : $38\frac{38}{185}$ cubic feet.

(3)

The compound weighs in air $50+390=440oz.$ The weight of an equal volume of water is $440-344=96oz.$ The weight of a volume of water equal to volume of the copper is $390-345=45oz.$ Therefore, weight of volume of water equal to volume of the wax is $96-45=51oz.$ Specific gravity of the pumice stone $=50\div 51=.980.$

(4)

Since the weight of the ice and of the displaced water are equal, we have $20.45\times 15.75\times 10.5\times .930=20.45\times 15.75\times$ height of displaced prism of water $\times 1.026$. Then, by cancelling, $10.5\times .930=$ height $\times$ 1.026; hence, height $=10.5\times .930\div 1.026=9.517yd.$ Therefore, $10.5-9.517=.983yd.=$ height of ice above the surface $=2ft.\ 11.383in.$

(5)

$6043\times 63=380709lb.=190\,T.\ 709lb.=$ weight of vessel.

(6)

$33-21=12=$ weight of an equal volume of water.
$33\div 12=2.75=$ specific gravity.

(7)

$17\div 2.35=7.234=$ specific gravity.

(8)

$250 \div 318 = .786 =$ specific gravity of the alcohol.

(9)

$14 - 8 = 6 =$ weight of water; $13.25 - 8 = 5.25 =$ weight of brandy; $5.25 \div 6 = .875 =$ specific gravity.

(10)

$2.837 \times 1000 = 2837oz. = 177lb.\ 5oz$

(11)

$36.4 \div 33 = 1.103 =$ specific gravity.

(12)

$\frac{1000}{1728}oz. =$ weight of a cubic inch of standard water.

$4 \times 3.1416 \times$ height of mercury $\times \frac{1000}{1728} \times 13.596 = 26.2 \times 16oz.$

Therefore, height of mercury $= \frac{26.2 \times 16 \times 1728}{4 \times 3.1416 \times 1000 \times 13.596} = 4.23in.$

(13)

$7.55 - 5.17 = 2.38gr. =$ weight of displaced water.

$7.55 - 6.35 = 1.20gr. =$ " " liquid.

$7.55 \div 2.38 = 3.172 =$ specific gravity of alabaster.

$1.20 - 2.38 = .504 =$ " " liquid.

(14)

$\frac{1000}{1728}oz. \times 21.5 = 12.442oz. =$ weight of cubic inch of platinum.

$\frac{1000}{1728}oz. \times 13.6 = 7.870oz. =$ " " " mercury.

$12.442 - 7.870 = 4.572oz. =$ required effort.

(15)

$3.1416 \times 81 \times \frac{34}{3}$ cubic inches = volume of cone.

$3.1416 \times 81 \times \frac{34}{3} \times \frac{1000}{1728}oz. \times 13.596 = 1418lb.\ 3.3841oz.$

MARIOTTE'S LAW.

(1)

12.3*lb.* : 10*lb.* : : 4.3*qt.* : 3.49*qt.*

(2)

8*qt.* : 20*qt.* : : 15*lb.* : 37.5*lb.*

(3)

The density being directly proportional to the pressure, we have

15*lb.* : 14.2*lb.* : : 2.6*gr.* : 2.46*gr.*

The density being diminished, the weight is diminished in the same proportion.

(4)

47*lb.* : 25*lb.* : : 1 : .5319.

(5)

25 : 47 : : 1 : 1.88.

(6)

9.5*lb.* : 22*lb.* : : 8*qt.* : 18.526*qt.*