Find the discount on £237. 10s. due 4 months hence at 4 per cent. simple interest. What would be the amount of the error in the above case if interest were taken instead of discount.

$\frac{4}{12} \times \frac{4}{1} \div \frac{4}{3} = 1\frac{1}{3}$
3

	£		s		d
As $101\frac{1}{3}$:	100	::	237		6

25
50 25
$\frac{100}{1} \times \frac{4}{2} \times \frac{3}{304} \times \frac{3}{132} \times \frac{3}{76} \times \frac{3}{4} = \frac{1875}{8} = 234\frac{3}{8}$

£	s	d
237	10	0
234	7	6
3	2	6 Discount

£	s	d
237	10	0
		4
950	0	0
316	13	4
		20
3,33		
		12
4.	0	0

£	s	d	
3	3	4	Int.
3	2	6	Disct.
0	0	10	

Ans: £. s. d.
3. 2. 6. Int. exceeds Disct. by 10d

A grocer buys coffee at the rate of £8. 10s. per cwt. and chicory at £2. 10s. per cwt. and mixes them in the proportion of 5 parts chicory to 7 coffee; at what rate must he sell the mixture so as to gain £16⅔ per cent. on his outlay?

Ratio of mixture is 5ch.: 7 cof.

£. s. £. s.
2. 10 × 5 + 8. 10 × 7 = 72/12 = £6 cost price of mix. per cwt

£ £ £
As 100 : 116⅔ :: 6 :

$\frac{350}{3} \times \frac{2}{100} = 7$ £ per cwt

Ans: 7.

At what rate per cent. simple interest will 3½d. produce 3½s. interest in 33⅓ years?

d3½ = 480 . s3½ = 40

7 £
40 = Interest upon 3½ d for 33⅓ years

$\frac{40}{33\frac{1}{3}} * 7 * \frac{3}{100} = 21$ £ int for 1 yr.

7 £ £ 21 £
As 480 : 100 :: 4000 : req.d rate

$$\frac{100}{1} \times \frac{21}{400} \times \frac{480}{7} = £36$$

Ans: 36 per cent.

If the sum of £1.200 be put out at 10 per cent per annum compound interest and interest paid half yearly, to what will it amount in a year and a half? What would it amount to in 4 years at the same rate at simple interest?

1½ years = 3 half years.

10 per cent per annum = 5 per cent for ½ yr.

£	S	D	
1200.	0.	0	principal for 1st half year
		5	
6000.	0.	0	

£	S	D	
1200.	0.	0	
60.	0.	0	
1260.	0.	0	principal for 2nd "
		5	
6300.	0.	0	

£	S	D	
1260.	0.	0	
63.	0.	0	
1323.	0.	0	principal for 3rd.
		5	
6615.	0.	0	
		20	
3.	0	0	

£	S	D	
1323.	0.	0	
66.	3.	0	Amt.
1389.	3.	0	

L
1200
10
12000
4
48000

L
1200
480
1680

Ans: 1389 . 3 ; 1680

If 3men working 11hrs a day can reap 20acres in 11days. how many men working 12hours a day will reap a field 360yds long and 320yds broad in 4 days

Area of 2nd field 360 x 320 = 23 Acres 1/4

12 : 11
As 20 : 23 1/4 :: 3men :
4 : 11

3
36
144
3 x 11 x 2880 x 11 = 9men.
12 120 121 4
4

Ans: 9men.

Divide 488 guineas among 5 men, 9 women and 3 boys, so that each woman may have $\frac{3}{5}$ of each man's share, and each boy $\frac{6}{7}$ of each woman's share.

Let x = man's share

Then $\frac{3x}{5}$ = woman's "

And $\frac{6}{7}\left(\frac{3x}{5}\right)$ = boy's "

$$5x + 9\left(\frac{3x}{5}\right) + \left\{\frac{6}{7}\left(\frac{3x}{5}\right)3\right\} = 488.$$

$$5x + \frac{27x}{5} + \frac{54x}{35} = 488$$

$$245x + 189x + 54x = 16680$$

$$\therefore x = \frac{16680}{488} = 35$$

$$\therefore x = 35,\ \frac{3x}{5} = 21,\ \frac{6}{7}\left(\frac{3x}{5}\right) = 18$$

Ans: 5 men get 245 9 women 189, and 3 boys 54 guineas

Find the amount of £ 254. 4 s. 8 m. for 5 years at 3½ per cent. per annum, simple interest.

£	s.	ds.	mils
	254.	4.	0. 8
			5
	1272.	0.	4. 0
½			3½
	3816.	1.	2. 0
	636.	0.	2. 0
	4452.	1.	4. 0
			10
	5,21		
			10
	2.14		
			10
	1.40		

L	s.	ds.	mls.
44	5	2	1.4
254	4	0	8
298	9	2	9.4

Ans:	L	s.	ds.	mls
	298	9	2	9.4

How much tea at 4s. 6d must be mixed with 50 lbs. at 6s. that the mixture may be sold at 5s. 6d?

Let x = quantity of tea at 4s. 6d. (in lbs)

Then $(x \times 4\frac{1}{2}) + (50 \times 6) = (50+x)\,5\frac{1}{2}$

$$\frac{9x}{2} + 300 = \frac{550+11x}{2}$$

$$9x + 600 = 550 + 11x$$

$$-2x = -50$$

Changing Signs

$$2x = 50$$

$$x = \frac{50}{2} = 25 \text{ lbs.}$$

Ans: 25 lbs.

One hundred stones being placed on the ground at the distance of a yard from one another, how far will a person travel, who shall bring them one by one, into a basket, placed at the distance of a yard from the first stone?

Here $a=1,\ d=2,\ n=101$.

$$S=\left[2a+(n-1)d\right]\frac{n}{2}$$

$$S=\left[2+(100-1)2\right]\frac{101}{2}=$$

$$S=2+(99\cdot 2)\frac{101}{2}=200\times\frac{101}{2}=10100\text{ yds}$$

$$1760\overline{)10100}\,(5$$
$$\underline{8800}$$
$$1300$$

miles. yds.
Ans: 5. 1300

A farmer parting with his stock sells to one person 9 horses and 7 cows for £300; and to another at the same prices, 6 horses and 13 cows for the same sum: what was the price of each

Let x = the price of each horse.

y = " cow.

Then $(x\times 9)+(y\times 7)=300$
$(x\times 6)+(y\times 13)=300$

(1) $9x+7y=300$
(2) $6x+13y=300$
Multiply (1) by 2 + (2) by 3, we have
(1) $18x+14y=600$
(2) $18x+39y=900$
By Subt. $25y=1300$

$$\therefore y=\frac{300}{25}=£12$$

$9x+7y=300$
$\therefore 9x+84=300$
$\therefore 9x=216$ or $x=£24$

Ans £24; £12.

Find the length of the side of a cube which contains 8060150125 solid inches

8060150125 | 2005

8

6005 | 12000000 | 60150125
30025
120300 25 | 60150125

Ans: 2005 inches

The weekly receipts of a Railway Company average £2683. 7s. 6d. from passenger, and £2117. 8s. from goods traffic. The expenses of working are £13.303. 7s. 2d. per calendar month. Their capital is 2 millions: what interest can they pay per share of £100?

£	s.	d.
2683.	7.	6
2117.	8.	0
4800.	15.	6

52

24960. 6. 0 receipts for 52 wks.
13303. 7. 2
12
159640. 6. 0 expenditure for 1yr
160000. 0. 0

£ £ £
As 2.000.000 : 90.000 :: 100 :

90.000 100 9
2.000.000 2 = 4½

Ans. 4½ per cent.

A man buys 50 shares in a railway at £20. 10s. per share; and 100 more at £7. 15s. per share. The half-yearly dividend is 3s. 4d. per share: what interest per cent. per annum does he make of his money?

£	s.
20	10
	50
£1025	0

£	s.
7	15
	100
£775	0

1025
775
1800

As 1800 : 50 :: 100 :

$$\frac{50 \times 100}{1800} = \frac{25}{9} = 2\frac{7}{9} \text{ per cent.}$$

Ans. $2\frac{7}{9}$.

Int: per share, per year s. d. 6. 8

s.	d.
6	8
	50
20	333. 4
	16. 13. 4

s.	d.
6	8
	100
20	66. 6. 8
	33. 6. 8
	16. 13. 4
£	50. 0. 0

A tradesman marks his goods with two prices, one for ready money, and the other for credit of 6 months: what fixed proportion ought the

two prices to bear to each other, allowing 5

per cent per annum simple interest.

$\frac{6}{12} \times \frac{5}{1} - \frac{5}{2} = 2\frac{1}{2}$

As $102\frac{1}{2}$: 100 :: 100 :

$\frac{100 \times 100 \times 2}{1 \quad 1 \quad 205} = \frac{4000}{41} = 97\frac{23}{41}$

Ans: $97\frac{23}{41} : 100 = 4000 : 4100 = 40 : 41$

What is the discount on £773. 6s. 11d. 2.5m.

due 5 months hence at 4½ per cent

$\frac{5}{12} \times \frac{9}{2} = \frac{15}{8} = 1\frac{7}{8}$

As $101\frac{7}{8}$: 100 :: £773 $\frac{49}{80}$:

$\frac{100}{1} \times \frac{62049}{80} \times \frac{8}{815} = \frac{12409}{163} = 761\frac{26}{163}$

£773 $\frac{49}{80}$

£761 $\frac{26}{163}$

£14 $\frac{3589}{13040}$ £. sh. ds. mils

£14. 2. 7. 5 nearly

Ans £14. 2. 7. 5 nearly

If 25 men can do a piece of work in 24 days working 8 hrs a day, how many hours a day would 30 men have to work in order to do the same piece of work in 16 days?

As $\begin{matrix} 30 : 25 \\ 16 : 24 \end{matrix} :: 8$

$$\begin{matrix} & & 2 \\ & & 4 \\ 5 & 12 & \\ \frac{25 \times 24 \times 8}{20 \quad 16} & = & 10 \\ 19 & 2 & \\ 3 & & \end{matrix}$$

Ans: 10 hrs

If 20 men in 3¼ days can dig 7 rectangular fields, each 130 yds by 150; how long will 37 men be digging 13 fields, each 90 yds by 129½?

$$\begin{matrix} 37 : 20 \\ \text{As } 7 : 13 :: 3\tfrac{1}{4} : \\ 130 : 90 \\ 150 : 129\tfrac{1}{2} \end{matrix}$$

$$\frac{20 \times 13 \times 90 \times 129\frac{1}{2} \times 3\frac{1}{4}}{37 \quad 7 \times 130 \times 150}$$

$$\begin{matrix} 2 & 3 & 7 \\ \frac{20 \times 13 \times 90 \times 259 \times 13}{37 \quad 7 \quad 130 \quad 150 \quad 24} & = & \frac{39}{20} = 1\frac{19}{20} \text{ Ans:} \\ & & 19 \quad 5 \end{matrix}$$

A rectangular bowling-green having been measured, it was observed that, if it were 5 feet broader and 4 feet longer, it would contain 116 ft more; but, if it were 4 ft broader and 3 ft longer, it would contain 113 ft more. Find its present area.

Let x = its length (in ft.)
And y = " breadth.
Then $x \times y$ = its present area.

$(x+4)(y+5) = xy + 116$
$(x+3)(y+4) = xy + 113$

(1) $xy + 5x + 4y + 20 = xy + 116$

(2) $xy + 4x + 3y + 20 = xy + 113$

By Subt: $x - y = 3$ (A)
From (1) $5x + 4y = 96$
Multiply (A) by 5 we have.

$5x - 5y = 15$
$5x + 4y = 96$
By Subt: $9y = 81$

$\therefore y = \frac{81}{9} = 9$

Substitute this value of y in (A) we have

$x - 9 = 3$
$\therefore x = 12$

$\therefore$ Ans: $12 \times 9 = 108$ sq. feet.

Divide £2025 among A, B, C, D, & so that A's share : B's share :: 1 : 2; C's share : B's :: 5 : 4, D's share : C's :: 6 : 5, and E's share : D's share :: 4 : 3

Let x = A's share

Then $2x$ = B's "

$\frac{5}{4}(2x)$ = C's "

$\frac{6}{5}\left\{\frac{5}{4}(2x)\right\}$ = D's.

And $\frac{4}{3}\left[\frac{6}{5}\left\{\frac{5}{4}(2x)\right\}\right]$ = E's.

$$x + 2x + \frac{5x}{2} + 3x + 4x = 2025$$

$$2x + 4x + 5x + 6x + 8x = 4050$$

$$25x = 4050$$

$$\therefore x = \frac{4050}{25} = 162$$

$\therefore$ A's £162, B's £324, C's £405, D's £486 and E's £648: Ans:

What sum of money lent at 5 per cent. simple interest for 3 years will amount to £828?

£ 100 / 3 / 300 / 3 / 15.00

As £115 : £100 :: £828 :

$$\frac{100 \times 828}{115} = £720 \text{ Ans:}$$

If 125 men can make an embankment 100 yds. long, 20 ft. wide, and 4 ft. high, in 4 days, working 12 hrs. a day, how many men must be employed to make an embankment 1000 yds. long, 16 ft. wide, and 6 ft. high, in 3 days, working 10 hrs. a day?

100 : 1000
20 : 16
As 4 : 6 :: 125
3 : 4
10 : 12

$$\frac{1000 \times 16 \times 6 \times 4 \times 12 \times 125}{100 \times 20 \times 4 \times 3 \times 10} = 2400$$

Ans: 2400

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E. Ayton

Silside