21. Find the number which multiplied by itself will give 
$$\frac{1}{2}$$
 of the difference between 10 dozen, and 2 dozen minus 2. Ans. 7.  
 $10 \times 12 - (2 \times 12 - 2)$ 

Solution. 
$$\frac{10 \times 12}{2} = 49$$
; and  $7 \times 7 = 49$ ;

7 is the number required.

22. If \$2.50 be gained on cloth sold at \$22.50; what would be the gain por cent? Ans. 121 %. 00 50

on. The gain per cent. 
$$=\frac{\$2.50 \times 100}{\$22.50 - \$2.50}$$

25000 = 121 %. 23. If a boy in running a race can beat a second boy 20 feet in 50 yards, how often would the first boy go around a course 1000 feet in circumference in the time the second boy would go 10 times ? Ans. 111 times.

Scintion. In 1000 feet, the first boy would beat the second by  $1000 \times 20$  ft. =  $133\frac{1}{2}$  ft.; and 10 times going around,  $10 \times 133\frac{1}{2}$  ft. 50 yd. × 3

=1333 ft.  $\therefore$  while the second boy would go around 10 times, the first boy would go  $10 \times \frac{13334}{1000} = 113300 = 113$  times. 24. If 50 yds of cloth be purchased at \$1.15 per yd., which will

yield the greater profit, the sale of the whole at 30 % more than the first cost; or the sale of  $\frac{3}{2}$  of the cloth at 55 % (profit) and the remainder at first cost ! Aus. The second way of selling.

Solution. First cost of cloth =  $\$1.15 \times 50$  yds. = \$57.50. Profit on first way of selling =  $\$57.50 \times 30 \div 100 = \$17.25$ .  $= \frac{3}{5} \text{ of } \$57.50 \times 55 \div 100 = \\ \$34.50 + 11 \div 20 = \$18.97 \frac{1}{2}.$ Profit on second

: the second way of selling yields \$1.721 more profit.

25. I paid \$25.00 for carpeting at \$1.25 per sq. yard. If the length of the floor for which the carpet was intended, was 15 feet, what was its width? Ans. 12 feet.

Solution. No. of yds. of carpeting purchased = 
$$\frac{825.00}{81.25}$$
 = 20 qs. yds

Width of the flour =20 so, vds, 
$$\times$$
 9 so, ft, + 15 feet = 12 feet.

26. How many square feet, mch board measure, are there in a board 27 feet long, 12 mches wide and 2 inches thick at one end, and 6 mches wide and 1 mch thick at the other end? feet.

1st solution. No. of square feet in the board = 17 ft. x {12in. x 2 in. +6 in. x 1in. +  $\sqrt{(12 in. x 2 in. x 6 in. x 1 in.)}$  $\pm 3 \times 12$  in. = 17 ft.  $\times (24$  sq. in.  $\times 6$  sq. in.  $\times 12$  sq. in.) = 36 = $\frac{17 \text{ ft.} \times 42 \text{ sq. in.}}{17 \text{ ft.} \times 42 \text{ sq. in.}} = 19_{d}^{5} \text{ sq. ft.}$ 

36

2nd solution. No. of square feet in the board =

$$\frac{27 \text{ ft.} \times (12 \text{ in.} \times 6 \text{ in.}) \rightarrow 2}{12 \text{ in.}} + \frac{17 \text{ ft.} \times 6 \text{ in.}}{12 \text{ in.} \times 2} + \frac{17 \text{ ft.} \times 6 \text{ in.}}{12 \text{ in.} \times 2}$$

 $12_{12} + 4_{12} + 212 = 195$  sq. ft.

27. Out of one square mile of land a farmer sold to A a lot 50 rods long, and 20 rods wide, and to B a lot 200 yards long. and 484 feet wide ; what fraction of the whole had he left ? Ans. 1505.

Solution 610 ac 
$$-\left(\begin{array}{c} 50 \text{ rd.} \times 20 \text{ rd.} + \frac{200 \text{ yds.} \times 3 \text{ ft.} \times 484 \text{ ft.}}{4 \text{ r.} \times 40 \text{ r.} \times 30 \text{ yd.} 9 \text{ ft.}}\right) = 640 \text{ oc.} - (61 \text{ ac.} \times 63 \text{ ac.}) = 640 \text{ ac.} - 121 \text{ ac.} = 627 \text{ sc.} = 640 \text{ ac.} - 121 \text{ ac.} = 627 \text{ sc.} = 627 \text{ sc.} = 7525 \text{ sc.} = 1505 \text{ sc.}$$
  
  $\therefore$  the fraction of the whole =  $627 \text{ sc.} = 7525 \text{ sc.} = 7505 \text{ sc.}$ 

640 7680-1536

28. If 7 lbs, of flour are worth 10 lbs. of herring; how much are 10 bbls, of herring worth, if the price of flour is \$5.69 per bbl.? Ans. \$40

Solution. The price of 7 bbls.=55.60×7 lbs. ÷ 196 lbs.=20 ets. : 10 bbls. herring=20c.×200 lbs.×10 bbls.+10 lbs.=840.

29. Which is the better investment, to buy 500 bbls. of flour, at \$5.50 per bbl., and sell it at \$5.70 during a period of 6 months, or lend the money during that time at 7% interest? Ans. The former is botter by \$3.75.

Solution. Cost of flour = 
$$\$5 \ 50 \times 500 \ bbls. = \$2,750.$$

Gain on flour = 
$$($3,70-$5,50) \times 500$$
 bbls. = \$100  
Inter, at on \$2,750 =  $$2,750 \times 7$  = \$90,25.

Inter. st on 
$$$2,750 = 100 \times 2$$

... The former is better by \$3.75.

30. In how many days will \$500 amount to \$225 at 6% ? Ans. 3041 days.

Interest on \$500 for 365 days at 
$$6_{1/2} = $500 \times 6 + 100 = $30$$
.

No. of d'ys req'd=(\$525 - \$500)×365d. - \$30= \$25 × 365d. = 3041 d. 830.

31. Simplify. 
$$\frac{36}{11} \times \frac{44}{5}$$
 of  $\frac{3}{12} - \frac{3}{4}$   
 $\frac{3}{12}$  Ans. 2

Sol. Expres. =  $\S$  ×  $\frac{1}{2}$  +  $\frac{1}{2}$  =  $\frac{1}{2}$  ×  $\frac{1}{2}$  -  $\frac{1}{2}$  =  $\frac{1}{2}$  ×  $\frac{1}{2}$  ×  $\frac{1}{2}$  =  $\frac{1}{2}$  ×  $\frac{1}{2}$  ×  $\frac{1}{2}$  =  $\frac{1}{2}$  ×  $\frac{1}{2}$ 32. If 6 of a ton of hay cost \$8.40, what will 3 of a cwt, cost ? Solution, Cost of 1 cwt.=( $\$8.40 \times 9$ ) $\div 6 \times 20 = \$.63$ . Ans. §49. " T " \_ \$ 63×7 \_ 8.10 

Out of a cask of molasses I sold to A 1 of the whole, to B 4, 1, and to B the remainder 30 collous them many college 
$$did$$

33. to C  $\frac{1}{35}$ , and to D the remainder, 30 gallons; how many gallons did the cask contain l Ans. 70 gallons. Sol

ution. The whole = 
$$\frac{1}{2} \times \frac{1}{4} \times \frac{1}{3} \times \frac{30}{2}$$
 gals. =  $\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{30}{3}$  y gals.   
=  $\frac{1}{2} \times \frac{30}{3}$  gals. : 30 gals. =  $\frac{1}{2} - \frac{1}{2} = \frac{9}{2}$ ; and the whole,  
=  $\frac{10}{2} \times \frac{1}{2} = \frac{70}{2}$  or ls.

34. If a perpendicular stick 6 feet high casts a shadow 10 feet long ; how high is a tree that casts a shadow 80 feet ? Ans. 48 feet. Solution. Height of tree=6 feet × 80 feet ÷ 10 feet=48 feet.

35. Reduce '468752 to a common fraction in its lowest terms. Ans. 234333.

Solution. 
$$468752 = \frac{467783}{100} = \frac{468706}{999900} = \frac{234353}{499950}$$

36. How many square yards are there in a path six feet wide, surrounding a garden 150 feet long and 100 feet wide ?. Ans. 3495 square yards. Sol.

No. of sq. yds. in the path=(150 ft. 
$$\times 2 \times 100$$
 ft.  $\times 2 \times 6$  ft.  $\times 4$ ).  
  $\times 6$  ft.  $\div 9$  sq. ft. = (300 ft.  $\times 200$  ft.  $\times 24$  ft.  
  $\times 7$  ft.  $\div 9$  so. ft.  $= \frac{524}{524}$  ft.  $\times 6^{2}$  ft.  $= 10^{-1}$  ft.  $\frac{10}{14}$  ft.  $\frac{10}{14}$  ft.  $\frac{10}{14}$ 

$$\gamma$$
 7 ft.  $\div$  9 sq. ft. =   
  $2 \cdot \frac{9}{3} \cdot \frac{100}{3} \cdot \frac{11}{3} \cdot \frac{100}{3} \cdot \frac{10$ 

37. A cask can be filled by a pipe in 21 hours, and emptied by another in 31 hours; in what time can the cask be filled if both another in  $3_2$  nouns; in what this can the case be infed pipes are kept running at the same time? Ans.  $8_1^2$  hours. Solution. The first pipe can fill  $\frac{1}{2}y_2 = \frac{2}{3} = \frac{1}{3}$  in 1 hour. The second pipe can empty  $\frac{1}{3}y_2 = \frac{2}{3} = \frac{1}{3}$  in 1 hour.  $\therefore$  the part of the cask filled  $= \frac{1}{3} - \frac{1}{3} = \frac{2}{3}$  in one hour. and the cask can be filled in  $\frac{3}{3} = \frac{2}{3}$  in one hour.

38. How many square feet of boards will enclose a field 30 rods by 40 rods, if the boards be 9 inches wide, and the fence four boards high, and what is the price of the lumber at \$6 50 per 1000 feet / Ans. Number of square feet required, 6,930 square feet, and the price, \$45,045.

Solution.-

Perimeter of the field in length=30rd. × 40rd × 2 × 164ft. = 2310 ft. No. of sq. feet required= 2,310 ft. × 4+9 in. +12 in. =6,930 sq. ft. Price of the lumber = 6,930 sq. ft. × \$6.50+1,000 sq. ft. = \$45,045. 39. If I sell goods at 2 of the first cost, and thereby loss 3 of an English sovereign, what is the first cost of the goods ? Ans. \$25.55.

Solution. -

The first cost of the goods= $\$4.863 \times 3 \times 1 = 140 \times 3 \times 1 = \$25.55$ . 40. If 500 yards of cotton be sold for \$57.50, and thereby 15%be gained on the whole ; what would be the first cost of the cotton per yard / Ans. 10 cents.

Solution. The first cost of the cotton per yard.

$$507.50 \times 100 = 50$$
  
= 115 × 500 = 10 cents.

An English examiner writes to the Pall Mall Gazette :

I can youch for the bona-fides of the following, which I have met with during the last two or three years as examiner in the Cam-bridge Local Examinations : "Pitt was a great statesman, Fox was a ditto, ditto; ho wrote a very good book of martyrs. Pitt and Fox both died a month after each other." 2. "The Gordian knot was a very difficult knot which Nero tied, and by means of which he kept the Empire of Rome in subjection.<sup>4</sup>

Here is a specimen of Japanese English borrowed from Mr. Fauld's "Nine years in Nipon" :-- "Notice. Shoe manufacturer Design at any choice The undersigned being engaged long and succeeded with their capacity at shoe factory of Isekats in Tokio; it is now established in my liability at undermentioned lot all furnishment will be attended in moderate term with good quality. An order is acceptable in receive a post, being called upon the measure and it will be forwarded in furnish. U. Inoya." This will serve as an exercise to be explained and paraphrased.

Soluti