

3. What is the square of a number? The square root?

Explain why, in extracting the square root of a number, you mark off the number into "periods of two figures each."

Simplify

$$(3\sqrt{32} - 2\sqrt{28}) \div (\sqrt{32} - \sqrt{28}).$$

$$\begin{aligned} & \frac{3\sqrt{32} - 2\sqrt{28}}{\sqrt{32} - \sqrt{28}} \\ &= \frac{(3\sqrt{32} - 2\sqrt{28})(\sqrt{32} + \sqrt{28})}{32 - 28} \\ &= 10 + 2\sqrt{14}. \end{aligned}$$

4. Define *ratio*, *proportion*, and *mean proportional*.

The quantity of saline matter in sea water is .036 of the whole weight, and of this weight .061 is magnesia. Find the number of grains of magnesia in a cubic foot of sea water, supposing 32 cubic feet of it to weigh 2000 lbs.

866½ grs.

5. Shew that "Bank" discount exceeds "True" discount by the simple interest on the True discount.

If \$6 be allowed as true discount on a bill of \$150 having a certain time to run, what would be the discount if the bill had twice as long to run?

\$11.53½.

6. *A* and *B* form a partnership, *A* supplying 25 per cent. more capital than *B*. At the end of the year *A* withdraws 60 per cent. of his capital, and *B* withdraws 40 per cent. of his; at the end of two years there is a gain of \$338.50 to be divided. How much does each receive?

$$A = 5 \text{ for } 1 \text{ yr. and } 2 \text{ for } 1 \text{ yr.} = 7;$$

$$B = 4 \text{ for } 1 \text{ yr. and } 1\frac{1}{2} \text{ for } 1 \text{ yr.} = 6\frac{1}{2}.$$

$$A : B :: 35 : 32,$$

$$A = \$1767.50; B = \$1616.$$

7. A merchant bought 350 yards of silk and 1470 yards of lustre, the price per yard of the lustre being 30 per cent. that of the silk; he sold the silk at a gain of 35 per cent. and the lustre at a loss of 33½ per cent., and lost on the whole \$39.20. Find the cost price of the silk per yard.

If 1 be price of the silk per yard, then  $\frac{3}{10}$

is that of the lustre. He gains  $\frac{7}{10}$  on silk per yard and loses  $\frac{1}{3}$  on lustre per yard.

$$\frac{1}{10} \times 1470 - \frac{7}{10} \times 350 = \$39.20;$$

$$\therefore 1 = \$1.60 = \text{price of silk per yard.}$$

8. An agent sold a consignment of flour for \$4800, and invested the proceeds (less his commission on both transactions) in the purchase of tea, receiving on the latter purchase 4 per cent. on the amount invested. His commission on both transactions being \$300, find his rate of commission on the sale of the flour.

2½½ per cent.

9. Find to six decimal places the average of 2½, 2.37, 3.006, 0, 2.97½, and 3.516.

2.744816.

10. There is a garden plot in the form of a trapezoid, whose two parallel sides are 40 yards and 50 yards respectively, the other sides being respectively 30 yards and 24 yards. Shew that the perpendicular distance between the parallel sides is  $\frac{3}{2}\sqrt{11}$ .

Let  $y$  = length of perpendicular between parallel sides, and  $x$  = distance from angle adjoining side 30.

$$\frac{-2}{30} - x^2 = \frac{-2}{24} - \frac{106}{10} - x, \quad x = \frac{106}{5},$$

$$30^2 = \left(\frac{106}{5}\right)^2 + 7^2; \therefore 7 = \&c.$$

#### ARITHMETIC (SECOND CLASS). c

1. The G. C. M. of two numbers is 9187, and their L. C. M. is 634938944494; one of the numbers is 68590142, find the other.

The G. C. M.  $\times$  L. C. M. = product of two numbers;

$$\therefore 634938944494 \times 9187 = 68590142 \times \text{No.};$$

$$\therefore \text{No.} = \frac{634938944494 \times 9187}{68590142} = 85044059.$$

2. (1) Divide 159.982 by .0009840018 to 7 places of decimals.

(2) Reduce  $\frac{61}{4649}$  to a periodic decimal.

(3) Reduce .7002457 to a vulgar fraction.

$$(1) \frac{159.982}{.0009840018} = 162583.0359253.$$