

$$(2) \frac{61}{4649} = .0131211.$$

$$(3) .7002457 = \frac{25935}{37037}.$$

3. There is a rectangular garden whose length is to its breadth as 6 to 5; running round its outside is a gravelled path 3 yards wide; this path cost, at $18\frac{3}{4}$ cents per square yard, \$127.25. Find the dimensions of the garden.

If the length of the side of the garden be represented by 6, the breadth will be 5 and the perimeter 22, and the area of the path will be 22×3 sq. yds. = 66 sq. yds.; but from the question, No. of sq. yds. in

$$\text{path} = \frac{12725 \times 4}{75} = \frac{509 \times 4}{3};$$

$$\therefore 66 = \frac{509 \times 4}{3}, \text{ and 6 or side} = \frac{509 \times 4}{33} = 61\frac{1}{3} \text{ yds.};$$

$$\text{and 5 or breadth} = \frac{509 \times 4 \times 5}{6 \times 33} = 51\frac{1}{3} \text{ yds.}$$

4. Simplify

$\frac{2\sqrt{90}}{3\sqrt{108}} \times \frac{7\sqrt{192}}{5\sqrt{126}} \div \frac{4\sqrt{15}}{15\sqrt{21}}$. Find the mean proportional between 3402 and 15172; and extract the square root of .000097199881.

The expression =

$$\frac{2\sqrt{2 \times 5 \times 3^2 \times 7} \sqrt{2^2 \times 3 \times 15} \sqrt{3 \times 7}}{3\sqrt{2^2 \times 3^3 \times 5} \sqrt{2 \times 7 \times 3^2 \times 4} \sqrt{3 \times 5}} = 4\frac{1}{3}.$$

5. The oxygen of the air is 3 parts (by volume) in 14 of the whole; 100 cubic inches of air weigh 31 grains, and the weight of oxygen is to that of air as 53:48. Find the number of grains of oxygen in a cubic foot of air.

$$\text{No. of grains} = \frac{31 \times 1728 \times 53 \times 3}{100 \times 48 \times 14}$$

$$= 126.46.$$

6. A, B and C do a piece of work; it would have taken A $2\frac{1}{2}$ times as long as B and C together, and B $3\frac{1}{2}$ times as long as A and C together. If they receive \$240.40 for the work, how much should each man receive?

A can finish the work alone in 18 days, B in 14 and C in 31; together they could do it in $\frac{1953}{311}$ days. $\therefore$ A's share of the

money = \$83.86 $\frac{1}{3}$, B's = \$107.83 $\frac{1}{3}$, C's = \$48.69 $\frac{1}{3}$.

7. Assuming that 80 cubic inches of lead, together with 81 cubic inches of cork, are equal in weight to 2308 cubic inches of pine, and that the weights of equal bulks of lead and pine are represented by the numbers 226.48, and 9, respectively; determine the proportionate weight of an equal bulk of cork.

A cubic inch of lead = $\frac{226.48}{9}$ cubic inches of pine in weight;

$\therefore$ 90 cubic inches of lead = 2264.8 cubic inches of pine in weight;

$\therefore$ 2308 cubic inches of pine - 2264.8 cubic inches of pine = 43.2 cubic inches of pine = 81 cubic inches of cork;

$\therefore$ a cubic inch of pine = $\frac{810}{432}$ cubic inches of cork;

$\therefore$ required numbers are, 9 lead = 226.48 pine = 424.65 cork.

8. A merchant in Toronto owes £560 stg. in London, and remits as follows: first to Paris at 5 francs 60 centimes per \$1; thence to Hamburg at 2 francs per marc; thence to Amsterdam at $17\frac{1}{2}$ stivers per marc; thence to London at 224 stivers per £1. If the expense of this circuitous exchange be 2 per cent. (i.e. of \$102 paid by the merchant, \$2 is lost in commission), find what it costs to discharge the London debt.

$$\text{\$560 stg.} = \$ \frac{224 \times 2 \times 2 \times 102 \times 560}{35 \times 5.60 \times 100} = \$2611.20.$$

9. I had two notes whose aggregate face-value was \$761.70, and each of which had 15 months to run; one of the notes was discounted at 10 per cent. bank discount, and the other at 10 per cent. true discount, and the total amount realized was \$671.50. Find the face of the note on which true discount was allowed.

10. A cylindrical silver wire, .0015 millimetre in diameter, weighs 3.2875 grammes; it is to be covered with a layer of gold .0002 millimetre in thickness. Required the weight of the gold, the specific gravity of silver being 10.47, and that of gold 19.26.