

$$(a). (a-b) (8a-3b)$$

$$(b). x(x-1) (a-b) (b-c) (c-a)$$

$$3. b^2 = 4ac$$

$$(a). \text{The ex is} = (a-b)^4 - 4(a^2+b^2)(a-b)^2 + 4(a^2+b^2)^2$$

$$\therefore \text{its sq. rt. is } (a-b)^2 - 2(a^2+b^2) i. e. -(a+b)^2$$

(b). Take $x-1, x, x+1, x+2$ as Nos., then the sum of their sqs is $4x^2 + 4x + 6$ and subtracting 5 from this we have $4x^2 + 4x + 1 = (2x+1)^2$

$$4. \text{ Let } \frac{a}{b} = \frac{c}{d} = \frac{e}{f} = x \text{ and } \frac{h}{k} = \frac{l}{m} = y$$

$$n = y$$

$$p$$

$$\text{Then } \frac{(a+c+e)(h+l+n)}{(b+d+f)(k+m+p)} = xy$$

$$\text{And } \frac{ah+cl+en}{bk+dm+fp} = xy \text{ \&c.}$$

$$(a). ex = \frac{ax-by}{ax+by}$$

$$(b). \text{ Clear of fractions, then } (x+y+z) - \left\{ \begin{array}{l} x+(xy+xz+yz)+y(xy+xz+yz) \\ +z(xy+xz+yz) \end{array} \right\} + 3xyz + xyz(xy+yz+xz) = 4xyz$$

$$i. e. 4xyz = 4xyz.$$

5. (a) Divide left hand side of $=n$ by $\sqrt{x+z}$ and rationalize the denominator of the resulting fraction.

(b). Adding and subtracting $a^{\frac{2}{3}} + b^{\frac{2}{3}} + c^{\frac{2}{3}}$ to the left hand side of the $=n$ it becomes

$$a^{\frac{2}{3}}(b+c+a) + b^{\frac{2}{3}}(b+c+a) + c^{\frac{2}{3}}(a+b+c) - 2(a^{\frac{2}{3}} + b^{\frac{2}{3}} + c^{\frac{2}{3}}) = \&c., \&c.$$

6. (a) Multiplying out, the coefs. of ax and x vanish and $x = \frac{1}{3}(a+b+c)$

(b) Find the value of x from first of these $=ns$ in terms of y and from the last in terms of z . Equate these values and we find that $z = 3y$. Substitute this in second $=n$ and $y = 0$ or $\frac{2}{3}$ and $x = 0$ or $\frac{2}{3}$.

(c) Multiply the first $=n$ by a and subtract the second from the result. From this result and $=n$ (1) we find the value of x and y in

terms of z . Substitute these values in 3rd $=n$ and we have $z = a - b$ from this $x = b - c$ and $y = c - a$

$$(d) \text{ Divide each of the fractions } \frac{x-1}{x+3} \text{ \&c.}$$

$$\text{out and we have } \frac{1}{x+1} + \frac{1}{x+3} - 1 = 0$$

$$\text{from which } x = -1 + \sqrt{2}$$

ARITHMETIC—VALUES—EACH TEN MARKS.

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.

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.

3. There is a rectangular garden whose length is to its breadth as 6 to 5; running round it 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.

$$4. \text{ Simplify } \frac{2\sqrt{80}}{3\sqrt{108}} \times \frac{7\sqrt{192}}{5\sqrt{126}} \cdot \frac{4\sqrt{15}}{15\sqrt{21}}$$

Find the mean proportional between 3402 and 15172; and extract the square root of .000097199881.

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.

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?

7. Assuming that 90 cubic inches of lead, together with 81 cubic inches of cork, are equal in weight to 2308 cubic inches of pine, and that the weight 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.