Q.1 A. Prove converse of pythagoras theorem (4)

B Solve (any two) (6)

1 $a^3+b^3+c^3-3abc$: Factorize

2 $(a+b+c)(ab+bc+ac)-abc$: Factorize

3 $\frac{x+2}{x-2}+\frac{x-2}{x+2}+\frac{16}{4-x^2}$: simplify

C Factorize (Any two) (4)

1 $16a^2-40ab+16b^2+6b-1$

2 $x^3-19x-30$

3 $2x^3+3x^2-3x-2$

D Solve any one of the following (2)

1 If $x=2.5$ then find the value of $1-x+x^2-\frac{x^3}{1+x}$

2 If 6 is the geometric mean of a and 4, find the value of a

E Fill in the blanks in the following statements by choosing the right answer from the brackets so as to make them true (4)

1 For $f: Z \to R$ $f(x)=2x^2-3x+5$; $f(-1)=$ _____ [4, 10, 7]

2 P is the set of positive prime numbers and $t: P \to N$ is defined as $t(x)=$ (the number of factors of x) $\therefore R_t=$ _____ [{1}, {2}, {1, 2}]

3 Computer stores the data received through _____ [IPD, OPD, CPU]

4 In a computer huge data is stored in
[memory unit, control unit, logical unit]

Q.2 A Prove that an angle inscribed in a semicircle is a right angle (4)

B Solve any two of the following (6)

1 $\frac{a}{4a+3b} = \frac{b}{4b+3a}$ find the value of each ratio.

2 If $\frac{a^2-bc}{x} = \frac{b^2-ac}{y} = \frac{c^2-ab}{z}$
then prove that
$ax+by+cz = (a+b+c)(x+y+z)$

3 If $x - y\alpha \frac{a}{b}$, and $x^2+xy+y^2\alpha \frac{b}{a}$
$(a \neq 0, b \neq 0)$
then prove that x^3-y^3 is a non-zero constant.

C Solve any two of following (4)

1 Mean and Median of grouped data are ₹2.50 and ₹3.9 respectively. Find the mode of the data.

2 The mean of 10 observation is 10 Find the mean of new observation obtained by adding 10 to each observation and then dividing each result by 10.

3 The observation of an ungrouped data are $\frac{x}{5}, x, \frac{x}{4}, \frac{x}{2}$ and $\frac{x}{3}$ $(x>0)$. If the median of the data is 8 then find the value of x.

D Solve any one of the following --- (2)

1 For $f: Z \to Z$; $f(x) = 2x^2 - 3x + 4$ find the value of $f(2) - f(-1)$

2 For $f: R \to R$ $f(x) = (x-5)^2$, find the value of $f(x+5)$

E Fill in the blanks in the following statements by choosing the right answers from the brackets so as to make them true: --- (4)

1 $\frac{x-y}{y-x} + \frac{5(x-y)^3}{(y-x)^3} + \frac{6(x-y)}{(y-x)^4} =$ _____ [0, 5, 6]

2 $\frac{a}{b+3c} = \frac{b}{c+3a} = \frac{c}{a+3b}$; $a+b+c \neq 0$ then each ratio = _____ $[\frac{1}{4}, 1, 3]$

3 The cube of x varies directly as the square of y and $x = 2$ when $y = 4$ then when $y = \frac{1}{2}$ then $x =$ _____ $[\frac{4}{3}, \frac{3}{4}, \frac{1}{2}]$

4 If $\tan 45 = \cot\theta$ then $\theta =$ _____ [30, 45, 60]

Q.3 A Prove that in the same circle, chords equidistant from the centre are congruent. --- (4)

B Two points at a distance a units

and b units from the base of the tower are on the same side of the tower on a line passing through the base of the tower. The angle of elevation of the top of the tower from these two points are complementary of each other prove that the height of the tower is $\sqrt{ab}$ units.

2 The surface area of a sphere is 2464 sq. cm. Find its diameter.

3 The slant height of a cone is 25 cm and the area of its curved surface is 550 sq cm. Find the volume of the cone.

C Solve any two ---(4)

1 Determine the value of:
$2\sin^2 60' + \sec^2 60' - 2\cos^4 45' - 3\operatorname{cosec}^2 60'$

2 Prove that $\frac{\sin^2\theta}{1-\cos\theta} + \frac{\sin^2\theta}{1+\cos\theta} = 2$

3 Prove that $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta \cdot \cos^2\theta$

D Solve any one of the following ---(2)

1 If $(2x-5y) \propto (2x+y)$ then prove that $x \propto y$ $(x \neq 0, y \neq 0)$

2 If $\tan^2\theta + \cot^2\theta = 2$ then prove that $\tan^4\theta + \cot^4\theta = 2$

E Answer the following questions as desired (4)

1 If the discriminant of the equation $5x^2 - 2x - k = 0$ is 64 then find k

2 Form the quadratic equation in x whose roots are $\frac{3}{2}$ and $\frac{2}{3}$

3 Define: Median of a Triangle

4 Define: Similarity of Triangles

Q.4 A For $\square^m$ ABCD B-E-C. $\overline{AE}$ and $\overline{DE}$ intersect each other in F. If $DF = 2EF$, then prove that E is the mid point of $\overline{BC}$ ---- (4)

B Solve any two of the following -- (6)

1 Find the difference $\frac{2x^2+x-6}{x-3} - \frac{x^2+7x-15}{x-3}$

2 Frequency distribution of daily wages of 50 workers is given below

Wages in Rs	20-29	30-39	40-49	50-59
Number of workers	5	27	15	3

Find the mean of the daily wages of the workers

3 Following frequency distribution is obtained on tossing 5 coins 100 times. Find the mean of the data

Num. of heads	0	1	2	3	4	5
Frequency	1	7	20	64	5	3

C Solve any two of the following -- (4)

1 In a circle with diameter 5 cm the length of a chord is 4 cm. Then find the distance of that chord from the centre.

2 Amongst chord $\overline{AB}$, $\overline{PA}$ and $\overline{PB}$ of a circle, chord $\overline{AB}$ is the longest chord of the circle and PA = PB Then find $m\angle PAB$

3 In $\triangle ABC$ $\angle B$ is a right angle. If AB = 3, BC = 4 then find the inradius of $\triangle ABC$

D Solve any one of the following --(2)

1 Find the roots of the equation $3x^2 + 2\sqrt{5}\,x - 5 = 0$.

2 Solve the eqn in R. $x^2 + (x+1)^2 = 221$

E Answer the following ---(4)

1 Define: circle

2 Define: Tangent of a circle

3 The formula for the area of a major sector is

4 The formulae for the volume of a cone is

Q.5 A. Construct O(0, 4.5 cm) and a regular octagon inscribed in the circle. write the steps of the construction --(4)

B. Solve any two of the following --(6)

1 The electricity bill is partly constant and partly varies as the number of units consumed. The bill is Rs 190 when the consumption is 100 Units and the bill is Rs 370 when the consumption is 200 Units. Find the amount of the bill when the consumption is 500 Units.

2 Solve the eqⁿ.

$$6\left(x^2+\frac{1}{x^2}\right)-35\left(x+\frac{1}{x}\right)=-62$$

3 The sum of the squares of two consecutive natural numbers is 145 Find the numbers.

C Solve any two of the following. ---(4)

1 $\overline{AD}$ is a median of ΔABC. If $AB=5$ $AC=7$ and $BC=10$ then find AD.

2 $\Delta ABC \sim \Delta DEF$. $BC=12$, $EF=5$ If area of ΔDFE is 25 then find the area of ΔABC

3 In ΔABC $m\angle B=90$ and $\overline{BM}$ is an altitude. If $CM=18$ and $BM=12$ then find AB

D Solve any one of the following ---(2)

(1) $\Delta ABC \sim \Delta PQR$. $AB=4$, $BC=8$, $AC=10$ and $PR=15$ then find the perimeter of ΔPQR

(2) Find the surface area of a sphere of diameter 10 cm ($\pi = 3.14$)

(E) $\overline{AB}$ is a diameter of a circle and $\overline{AC}$ is a chord of the circle other than diameter. The tangent of the circle drawn at the point C intersects the ray opposite to $\overrightarrow{BA}$ in D. If $m\angle BAC = 30$ prove that $BD = BC$ ---(4)

OR

(E) Answer the following questions --(4)

1 $\odot(P, 5)$ and $\odot(Q, 3.8)$ touch each other internally Then find PQ

2 state with reason whether $P \notin (P, 4)$ is true or false.

3 Name a special subset of a circle.

4 Two chords $\overline{AB}$ and $\overline{CD}$ of the same circle bisect each other If $AB = 9$ then find the radius of the circle.

Q1A Given + To prove that + fig ½ 1 Mark
Proof ½ 1 Mark

B1 $a^3+b^3+c^3-3abc$

$\therefore (a+b)^3-3ab(a+b)+c^3=3abc$] 1

$\therefore m^3-3abm+c^3-3abc$

$\therefore (m+c)(m^2-mc+c^2)-3ab(m+c)$] 1

$\rightarrow (m+c)(m^2-mc+c^2-3ab)$

$\rightarrow (a+b+c)(a^2+2ab+b^2-ac-bc+c^2-3ab)$] 1

$\rightarrow (a+b+c)(a^2+b^2+c^2-ab-bc-ac)$ Ans

2 $a^2b+abc+a^2c+ab^2+b^2c+abc+abc+bc^2+ac^2-abc$

$\therefore a^2b+a^2c+ab^2+2abc+ac^2+b^2c+bc^2$] 1

$\therefore a^2(b+c)+a(b^2+2bc+c^2)+bc(b+c)$

$\therefore a^2(b+c)+a(b+c)^2+bc(b+c)$] 1

$\therefore (b+c)(a^2+ab+ac+bc)$

$\therefore (b+c)(a+b)(a+c)$] 1

$\therefore (a+b)(b+c)(c+a)$ // Ans

3 $\frac{x+2}{x-2}+\frac{x-2}{x+2}-\frac{16}{x^2-4}$] 1

$\therefore \frac{x+2}{x-2}+\frac{x-2}{x+2}-\frac{16}{(x-2)(x+2)}$

$\rightarrow \frac{(x+2)^2+(x-2)^2-16}{(x-2)(x+2)}$] 1

$\rightarrow \frac{x^2+4x+4+x^2-4x+4-16}{(x-2)(x+2)}$

$\rightarrow \frac{2x^2-8}{(x-2)(x+2)}$

$\rightarrow \frac{2(x-2)(x+2)}{(x-2)(x+2)}$ 1

$= 2$ // Ans

C1 $16a^2-40ab+25b^2-9b^2+6b-1$] 1

$\rightarrow 16a^2-40ab+25b^2-(9b^2-6b+1)$

$\therefore (4a-5b)-(3b-1)$
$\therefore (4a-5b-3b+1)\ (4a-5b+3b-1)$] 1
$\therefore (4a-8b+1)\ (4a-2b-1)$ / Ans.

2 $x^3-4x-15x-30$] 1
$\therefore x(x-2)(x+2)-15(x+2)$
$\therefore (x+2)(x^2-2x-15)$] 1
$\therefore (x+2)(x-5)(x+3)$ / Ans.

3 $2x^3+3x^2-3x-2$] 1
$\therefore 2x^3-2x^2+5x^2-5x+2x-2$
$\therefore 2x^2(x-1)+5x(x-1)+2(x-1)$
$\therefore (2x^2+5x+2)(x-1)$] 1
$\therefore (2x^2+4x+x+2)(x-1)$
$\therefore (2x+1)(x+2)(x-1)$ / Ans.

D 1 ~~Solve~~ $\dfrac{(1+x)(1-x+x^2)-x^3}{1+x}$] 1
$\therefore \dfrac{1+x^3-x^3}{1+x}$] ½ $= \dfrac{1}{1+23} = \dfrac{1}{24}$] ½ Ans.

2 $36 = 4 \cdot a$] 1 $\therefore a = 36/4$] ½
$a = 9$] ½ / Ans

E (1) 10 (2) {2} (3) IPD (4) memory unit

Q.2 A given + T.P.T + fig - 1 Mark Proof 3 Marks.

B 1 If $a+b \neq 0$ $\therefore e.r = \dfrac{a+b}{4a+3b+4b+3a}$] 1½
$\therefore e.r = \dfrac{a+b}{7a+7b}$ $\therefore e.r = \dfrac{a+b}{7(a+b)} = \dfrac{1}{7}$ / Ans.

If $a+b=0 \therefore a=-b$ 1½
$e.r = \dfrac{-a}{4a+3b} = \dfrac{-b}{-4b+3b} = \dfrac{-b}{-b} = 1$ / Ans

If $a^2+b^2+c^2-ab-bc-ac \neq 0$

2 $e.s = \dfrac{a^2+b^2+c^2-ab-bc-ac}{x+y+z}$

Now $\dfrac{a}{a} \times \dfrac{a^2-bc}{x} = \dfrac{b}{b} \times \dfrac{b^2-ac}{y} = \dfrac{c}{c} \times \dfrac{c^2-ab}{z}$

$e.s = \dfrac{a^3+b^3+c^3-3abc}{ax+by+cz}$ / 1 Mark

$\therefore \dfrac{a^2+b^2+c^2-ab-bc-ac}{x+y+z} = \dfrac{a^3+b^3+c^3-3abc}{ax+by+cz}$

$\therefore \dfrac{a^2+b^2+c^2-ab-bc-ac}{x+y+z} = \dfrac{(a+b+c)(a^2+b^2+c^2-ab-bc-ac)}{ax+by+cz}$ 1 Mark

$\therefore \dfrac{a^2+b^2+c^2-ab-bc-ac}{a^2+b^2+c^2-ab-bc-ac} = \dfrac{(a+b+c)(x+y+z)}{ax+by+cz}$

$\therefore ax+by+cz = (a+b+c)(x+y+z)$ / Ans

1 Mark

Q 3 $x - y = \frac{m}{b}$, $m \neq 0$, m = constant

$x^2 + xy + y^2 = \frac{n}{a}$, $n \neq 0$, n = constant] 1

$\Rightarrow x^3 - y^3 = (x-y)(x^2+xy+y^2)$] 1

$= \frac{m}{b} \times \frac{n}{a} = m \cdot n = n \cdot a \cdot c$] 1

$\Rightarrow x^3 - y^3$ is non zero constant.

C (1) $z = 3m - 2\bar{x}$

$z = 3(73.9) - 2(72.5)$] 1

$\Rightarrow z = 221.7 - 145.0$] 1

$\Rightarrow z = 76.7$

2. $n = 10$, $\bar{x} = 10$,

New $\bar{x} = \frac{\text{old } \bar{x} + 10}{10} = \frac{10+10}{10} = \frac{20}{10}$

$= 2$ / Ans

3 $\frac{x}{5}, \frac{x}{4}, \frac{x}{3}, \frac{x}{2}, x$] ½ $n = 5$ n is odd

$\therefore M = \frac{n+1}{2}$ th ob] ½

$\therefore M = 3^{rd}$ ob $\Rightarrow \frac{x}{3} = 8 \Rightarrow x = 24$] 1

D (1) $f(2) = 8 - 6 + 4 = 6$ and

$f(-1) = 2 + 3 + 4 = 9$

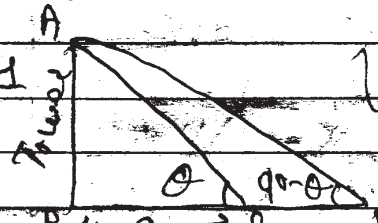
$\therefore f(2) - f(-1) = 6 - 9 = -3$ Ans.

(2) $f(x) = (x-5)^2$] 1

$\therefore f(x+5) = (x+5-5)^2 = x^2$] ½ Ans

E (1) 0 (2) $\frac{1}{4}$ (3) $\frac{1}{2}$ (4) 45

Q.3 A given + T.P.T + fig] 1 Mark proof 3 Marks



$\tan C = \frac{AB}{BC}$ $\tan D = \frac{AB}{BD}$] 1

$\Rightarrow \tan\theta = \frac{AB}{a}$ $\tan(90-\theta) = \frac{AB}{b}$] 1

$\Rightarrow \cot\theta = \frac{AB}{b}$ — (I)

$\Rightarrow \tan\theta = \frac{b}{AB}$ — (II)

from I and II

$\frac{AB}{a} = \frac{b}{AB} \Rightarrow AB^2 = ab$] 1

$\therefore AB = \sqrt{ab}$ / Proved

2 S.A of asphere $= 4\pi r^2$] 1

$4 \times \frac{22}{7} \times r^2 = 2464$ / 1

$\Rightarrow r^2 = \frac{2464 \times 7}{22 \times 4}$ $\Rightarrow r = 14$ cm $\Rightarrow d = 28$ cm] 1

$\therefore$ diameter $= 28$ cm /

3 C.S.A of the cone $= \pi \cdot r \cdot l$] 1

$\Rightarrow 550 = \frac{22}{7} \times 7 \times l$

$\Rightarrow l = 550 \times \frac{7}{22} \times \frac{1}{7} \times \frac{1}{25}$

$\therefore r = 7\text{ cm}$

$l^2 = h^2 + r^2$ 1

$\therefore h^2 = l^2 - r^2$

$= 625 - 49 = 576$

$\therefore h = 24$

$\therefore$ Volume of the cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24$ 1

$= 1232$ cu. cm

C (1) $2\left(\frac{\sqrt{3}}{2}\right)^2 + (2)^2 - 2\left(\frac{1}{\sqrt{2}}\right)^4 - 3\left(\frac{2}{\sqrt{3}}\right)^2$ 1

$= 2\left(\frac{3}{4}\right) + 4 - 2\left(\frac{1}{4}\right) - 3\left(\frac{4}{3}\right)$ 1

$= \frac{3}{2} + 4 - \frac{1}{2} - 4$

$= 1$ / Ans.

2 L.H.S $\frac{\sin^2\theta}{1-\cos\theta} + \frac{\sin^2\theta}{1+\cos\theta}$

$\therefore \frac{(1-\cos\theta)(1+\cos\theta)}{1-\cos\theta} + \frac{(1-\cos\theta)(1+\cos\theta)}{1+\cos\theta}$

$\therefore 1+\cos\theta + 1-\cos\theta$

$= 2 = R.H.S.$

3 L.H.S. $\sin^6\theta + \cos^6\theta$

$\therefore (\sin^2\theta + \cos^2\theta)(\sin^4\theta - \sin^2\theta \cdot \cos^2\theta + \cos^4\theta)$

$\therefore \sin^4\theta + 2\sin^2\theta \cdot \cos^2\theta + \cos^4\theta - 3\sin^2\theta \cdot \cos^2\theta$

$\therefore (\sin^2\theta + \cos^2\theta)^2 - 3\sin^2\theta \cdot \cos^2\theta$

$\therefore 1 - 3\sin^2\theta \cdot \cos^2\theta = R.H.S.$

D (1) $2x - 5y = k(2x + y)$ $k \neq 0$, k = constant

$\therefore 2x - 5y = 2kx + ky$

$\therefore x(2 - 2k) = y(k + 5)$

$\therefore \frac{x}{y} = \frac{k+5}{2-2k} \Rightarrow \frac{x}{y} =$ N.P.C $\Rightarrow x \propto y$

2 $\tan^2\theta + \cot^2\theta = 2$

$\Rightarrow (\tan^2\theta + \cot^2\theta)^2 = 4$

$\Rightarrow \tan^4\theta + 2\tan^2\theta \cdot \cot^2\theta + \cot^4\theta = 4$

$\Rightarrow \tan^4\theta + 2 + \cot^4\theta = 4$

$\Rightarrow \tan^4\theta + \cot^4\theta = 2$ / Proved

E (1) $a = 5, \quad b = -2, \quad c = -k$

$64 = \Delta \Rightarrow 64 = b^2 - 4ac$

$\Rightarrow 4 + 20k = 64$

$\Rightarrow 20k = 60$

$\Rightarrow k = 3$ / Ans

(2) $\alpha = \frac{3}{2} \quad \beta = \frac{2}{3}$

$\Rightarrow \alpha + \beta = \frac{3}{2} + \frac{2}{3} = \frac{9+4}{6} = \frac{13}{6}$

$\alpha \cdot \beta = \frac{3}{2} \times \frac{2}{3} = 1$

$\Rightarrow x^2 - x(\alpha + \beta) + \alpha \cdot \beta = 0$

$\Rightarrow x^2 - \frac{13}{6}x + 1 = 0$

$\Rightarrow 6x^2 - 13x + 6 = 0$ / Ans.

$\frac{3}{4}$ { Define 1 Mark each.

Q.4 A given + F.D.T + fig = 1 Mark proof 3 Marks.

B(1) $\frac{2x^2 + x - 6 - x^2 - 7x + 15}{x - 3}$

$\Rightarrow \frac{x^2 - 6x + 9}{x - 3}$

$\Rightarrow \frac{(x-3)^2}{x-3}$

$= x - 3$ / Ans

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Wages in Rs	Num. of workers	Mid Value x_i	$u_i = \frac{x_i - A}{C}$	$f_i u_i$
20-29	5	24.5	−1	−5
30-39	27	A 34.5	0	0
40-49	15	44.5	1	15
50-59	3	54.5	2	6
	$n = 50$			$\Sigma f_i u_i = 16$

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$$\bar{x} = A + \frac{\Sigma f_i u_i}{n} \times C$$

$$= 34.5 + \frac{16 \times 10}{50}$$

$$= 34.5 + 3.2 = 37.7 \text{ Rs.}$$

(3) Num. of heads

x_i	Freq. f_i	$f_i x_i$
0	1	0
1	7	7
2	20	40
3	64	192
4	5	20
5	3	15
	$n = 100$	$\sum f_i x_i = 274$

$$\bar{x} = \frac{\sum f_i x_i}{n} = \frac{274}{100} = 2.74$$

$\therefore \bar{x} = 2.74$ heads.

(4) (1) $d = 5 \Rightarrow r = 2.5$

$\overline{PM} \perp \overline{AB}$

$\Rightarrow MB = \frac{1}{2} AB = 2$

In ΔPMB

$PM^2 = PB^2 - MB^2$

$= 6.25 - 4$

$= 2.25$

$\therefore PM = 1.5$ Cm / Ans

(2) AB is a dia.

PA = PB $\Rightarrow$ m∠PAB = m∠PBA

In ΔPAB m∠PAB + m∠PBA + m∠APB = 180

$\Rightarrow$ m∠PAB + m∠PAB + 90 = 180

$\Rightarrow$ m∠PAB = 45 / Ans

3. $AC^2 = 25 + 144$ $9 + 16$

$\Rightarrow$ AC = 5

Area of $\Delta ABC = \frac{1}{2} r(AB + BC + AC)$

$\Rightarrow \frac{1}{2} \times 3 \times 4 = \frac{1}{2} r(3 + 4 + 5)$

$\Rightarrow 12 = 12r$

$\Rightarrow r = 1$ / Ans.

D (1) $a = 3, \quad b = 2\sqrt{5} \quad c = -5$.

$\Delta = b^2 - 4ac$

$= 20 + 60 = 80$

$\Rightarrow \sqrt{\Delta} = 4\sqrt{5}$

$\alpha = \frac{-b - \sqrt{\Delta}}{2a}, \quad \beta = \frac{-b + \sqrt{\Delta}}{2a}$

$\Rightarrow \alpha = \frac{-2\sqrt{5} - 4\sqrt{5}}{6}, \quad \beta = \frac{-2\sqrt{5} + 4\sqrt{5}}{6}$

$\Rightarrow \alpha = \frac{-6\sqrt{5}}{6} \quad \beta = \frac{2\sqrt{5}}{6}$

$\Rightarrow \alpha = -\sqrt{5} \quad \beta = \frac{\sqrt{5}}{3}$

$\Rightarrow$ Roots are $\{-\sqrt{5}, \frac{\sqrt{5}}{3}\}$.

2 $x^2 + x^2 + 2x + 1 = 221$

$\Rightarrow 2x^2 + 2x - 220 = 0$

$\Rightarrow x^2 + x - 110 = 0$

$\Rightarrow (x + 11)(x - 10) = 0$

$\Rightarrow x + 11 = 0$ or $x - 10 = 0$

$\Rightarrow x = -11$ or $x = 10$

$\Rightarrow$ Solu^n $\{-11, 10\}$

E 1, 2, Define one mark each (3) $\pi r^2 - \frac{\pi r^2 \theta}{360}$ (4) $\frac{1}{3}\pi r^2 h$

Q.5 A Cons^n cons 3 Marks steps 2 Marks.

B.(1) Let y is bill x, num. of units

$y = a + bx$, (a, b non-zero constants)

$190 = a + 100b$, $a + 100b = 190$

$370 = a + 200b$ $\rightarrow a + 180 = 190$

$-180 = -100b$ $\rightarrow a = 10$

$\rightarrow b = 1.8$

$\rightarrow y = 10 + 1.8x$ $x = 500$, $y = ?$

$y = 10 + 1.8(500)$

$\rightarrow y = 10 + 900$

$\rightarrow y = 910$ ₹ / Ans

2 $\sup \; x + \frac{1}{x} = m$ $\rightarrow x^2 + \frac{1}{x^2} = m^2 - 2$

$\rightarrow 6m^2 - 12 - 35m + 62 = 0$

$\rightarrow 6m^2 - 35m + 50 = 0$

$\rightarrow (3m - 10)(2m - 5) = 0$

$\rightarrow 3m - 10 = 0$ or $2m - 5 = 0$

$\rightarrow m = \frac{10}{3}$ or $m = \frac{5}{2}$

$x + \frac{1}{x} = \frac{10}{3}$ or $x + \frac{1}{x} = \frac{5}{2}$

$\rightarrow 3x^2 - 10x + 3 = 0$ or $2x^2 - 5x + 2 = 0$

$\rightarrow (3x - 1)(x - 3) = 0$ or $(x - 2)(2x - 1) = 0$

$\rightarrow x = \frac{1}{3}$ or $x = 3$ or $x = 2$ or $x = \frac{1}{2}$

$\rightarrow$ Roots $\{3, \frac{1}{3}, 2, \frac{1}{2}\}$

3 Sup. one num = x
→ ∴ it's cons. num is x+1
→ $x^2 + (x+1)^2 = 145$
→ $x^2 + x^2 + 2x + 1 = 145$
→ $2x^2 + 2x - 144 = 0$
→ $x^2 + x - 72 = 0$
→ $(x+9)(x-8) = 0$
→ $x+9 = 0$ or $x-8 = 0$
→ $x = -9$ or $x = 8$
-9 is not a natural number

→ req. natural num is 8 and its cons. natural no is 9.

C (1) In ΔABC, $\overline{AD}$ is a Median
→ $BD = CD = \frac{1}{2} BC$ → $BD = CD = 5$

→ Acc. to Apollonius theo.
$AB^2 + AC^2 = 2AD^2 + 2BD^2$
$25 + 49 = 2AD^2 + 50$
→ $2AD^2 = 74 - 50$
→ $AD^2 = 12$ → $AD = 2\sqrt{3}$ /

(2) $\Delta ABC \sim \Delta DEF$
$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{BC^2}{EF^2}$
→ $\frac{\text{Area of } \Delta ABC}{25} = \frac{4}{25}$
→ Area of $\Delta ABC = \frac{4 \times 25}{\times 25} = 4$ /

3 $BM^2 = AM \times CM$ (Theo. 9)
$144 = AM \times 18$

$\Rightarrow AM = \frac{144}{18}$

$\Rightarrow AM = 8$ and A - M - C

$\therefore AC = AM + CM = 8 + 18 = 26$

$AB^2 = AM \times AC = 8 \times 26$

$\therefore AB = 4\sqrt{13}$

D. (1) $\triangle ABC \sim \triangle PQR$

$\frac{\text{Peri. of } \triangle ABC}{\text{Peri. of } \triangle PQR} = \frac{AC}{PR}$

$\frac{10}{15} = \frac{4+8+10}{\text{Peri. of } \triangle PQR}$

Peri. of $\triangle PQR = \frac{22 \times 15}{10} = 33$

(2) $d = 10 \Rightarrow r = 5$ cm

S.A. of Sphere $= 4\pi r^2$

$= 4 \times 3.14 \times (5)^2$

$= 314$ sq cm

E Rider given + T.P.T + fig 1 Mark proof 1 Mark

OR

1. $PQ = 5 - 3.8 = 1.2$
2. True: because the centre of a circle is not a point on the circle
3. An arc.
4. 4.5

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