2024. Standard Maths Solution of Gala Paper - 5.

Section - B.

Solu - 25 :-

Suppose $3+2\sqrt{5}$ is a rational.

Then, $3+2\sqrt{5} = \frac{a}{b}$; where a and b are co-prime integers.

So , $2\sqrt{5} = \frac{a}{b} - 3$

$\sqrt{5} = \frac{1}{2}\left(\frac{a}{b} - 3\right)$

As a and b are integers, $\frac{1}{2}\left(\frac{a}{b} - 3\right)$ is a rational number.

So $\sqrt{5}$ is also rational number.

This contradict the fact that $\sqrt{5}$ is irrational.

Hence our assumption is incorrect.

So, we conclude that $3+2\sqrt{5}$ is a irrational

Solu 26 :- $ax + by = \frac{a+b}{2}$

$\therefore 2ax + 2by = a+b$ ......(i)

$\rightarrow 3x + 5y = 4$ .... (ii)

Multiplying eq.(i) by 3 & eq (ii) by 2a

we got,

$$\begin{array}{r} 6ax + 6by = 3a + 3b \\ 6ax + 10ay = 8a \\ - \quad\quad - \quad\quad - \\ \hline (6b - 10a)y = -5a + 3b \end{array}$$

$$y = \frac{3b-5a}{6b-10a}$$

$$y = \frac{\cancel{3b-5a}}{2\cancel{(3b-5a)}}$$

$$\boxed{y = \frac{1}{2}}$$

Putting the value of y in eq.(ii),

eq.(ii), $3x + 5y = 4$

$$3x + 5 \times \frac{1}{2} = 4$$

$$3x + \frac{5}{2} = 4$$

$$3x = 4 - \frac{5}{2}$$

$$3x = \frac{8-5}{2}$$

$$3x = \frac{3}{2}$$

$$x = \frac{\cancel{3}}{2 \times \cancel{3}}$$

$$x = \frac{1}{2}$$

∴ Hence, $x = \frac{1}{2}$ & $y = \frac{1}{2}$

Solu-27

$$2x^2 - 7x + 3 = 0$$

$$2x^2 - 6x - x + 3 = 0$$

$$2x(x-3) - 1(x-3) = 0$$

$$(x-3)(2x-1) = 0$$

$x - 3 = 0$ & $2x - 1 = 0$

$x = 3$ $2x = 1$

$x = \frac{1}{2}$

Roots of the eq. are 3 & 1/2.

Solu-28 :-

Let, the two numbers be x and y

$$x + y = 24 \quad \ldots\ldots (i)$$

$$x \times y = 143 \quad \ldots\ldots (ii)$$

$$x = \frac{143}{y}$$

Putting the value of x in eq.(i)

$\rightarrow$ Eq.(i), $x + y = 24$

$$\frac{143}{y} + \frac{y}{1} = 24$$

$$\frac{143 + y^2}{y} = 24$$

$$143 + y^2 = 24y$$

$$y^2 - 24y + 143 = 0$$

143 → −13, −11

11	143
13	13
	1

$$y^2 - 13y - 11y + 143 = 0$$

$\therefore y(y-13) - 11(y-13) = 0$

$\therefore (y-13)(y-11) = 0$

$y - 13 = 0$ & $y - 11 = 0$

$\underline{y = 13}$ $\qquad$ $\underline{y = 11}$

$\rightarrow$ let, $y = 13$

& $x = \frac{\cancel{143}^{11}}{\cancel{13}} = 11$

$\rightarrow (x, y) = (11, 13)$

<u>Solu-29</u> :-

AP : 16, 6, −4, ...

$a = 16$

$d = 6 - 16$

$= -10$

$n = 30$

Sum of first n terms,

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$S_{30} = \frac{30}{2}[2 \times 16 + (30-1)(-10)]$$

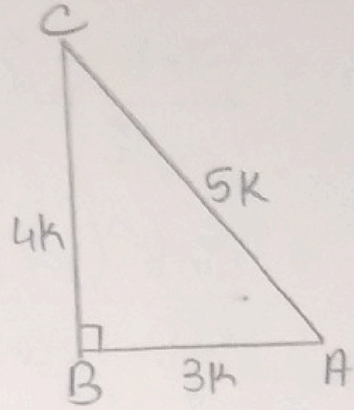
$$= 15[32 + (29)(-10)]$$

$$= 15[32 - 290]$$

$$= 15 \times (-258)$$

$$\boxed{S_{30} = -3870}$$

Ans 30:-



$$\tan A = \frac{BC}{AB} = \frac{4}{3}$$

let k be any number

$BC = 4K$

$AB = 3K$

$AC^2 = AB^2 + BC^2$

$= (3K)^2 + (4K)^2$

$= 9K^2 + 16K^2$

$AC^2 = 25K^2$

$AC = \sqrt{25K^2}$

$AC = 5K$

$$\sin A = \frac{BC}{AC} = \frac{4\cancel{K}}{5\cancel{K}} = \frac{4}{5}$$

$$\cos A = \frac{AB}{AC} = \frac{3\cancel{K}}{5\cancel{K}} = \frac{3}{5}$$

$$\operatorname{cosec} A = \frac{1}{\sin A} = \frac{5}{4}$$

$$\sec A = \frac{1}{\cos A} = \frac{5}{3}$$

$$\cot A = \frac{1}{\tan A} = \frac{3}{4}$$

Solu = 31

$$\sin^2\theta = 1 - \cos^2\theta$$

$$L.H.S = \frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta}$$

$$= \frac{\sin\theta\,(1 - 2\sin^2\theta)}{\cos\theta\,(2\cos^2\theta - 1)}$$

$$= \tan\theta\left[\frac{1 - 2(1-\cos^2\theta)}{2\cos^2\theta - 1}\right]$$

$$= \tan\theta\left[\frac{1 - 2 + 2\cos^2\theta}{2\cos^2\theta - 1}\right]$$

$$= \tan\theta\left(\frac{\cancel{2\cos^2\theta - 1}}{\cancel{2\cos^2\theta - 1}}\right)$$

$$= \tan\theta = R.H.S$$

Solu - 32

$AO = 13\,cm$

$OP = 5\,cm$

In $\triangle OPA$, $\angle P = 90^\circ$

According to Pythagoras theorem,

$\therefore AO^2 = OP^2 + AP^2$

$\therefore 13^2 = 5^2 + AP^2$

$\therefore 169 = 25 + AP^2$

$\therefore 169 - 25 = AP^2$

$\therefore 144 = AP^2$

$\therefore \sqrt{144} = AP$

$\therefore 12 = AP$

$\therefore AP = 12\,cm$

$\therefore AB = 2AP$ [P is mid-point of AB]

$= 2(12)$

$\boxed{= 24cm}$

Solu: 33

$l = 50$ cm

$b = 25$ cm

$h = 10$ cm

$n = 50$

→ Volume of cuboidal Cake $= lbh$

$= 50 \times 25 \times 10$

$= 12500 \text{ cm}^3$

→ Cake received by each friend $= \frac{12500}{n} = \frac{\cancel{12500}^{250}}{\cancel{50}} \boxed{= 250 \text{cm}^3}$

Solu: 34

$a = 110$

$\Sigma f_i u_i = 190$

$\Sigma f_i = 200$

$h = 20$

$\bar{x} = ?$

→ mean, $\bar{x} = a + \frac{\Sigma f_i u_i}{\Sigma f_i} \times h$

$= 110 + \frac{19\cancel{0}}{2\cancel{00}} \times 2\cancel{0}$

$= 110 + 19$

$\boxed{\bar{x} = 129}$

Solu = 35

$l = 50$

$h = 160$

$cf = 72$

$f = 20$

$h = 10$

$m = ?$

$\rightarrow$ median, $m = l + \left(\frac{n/2 - cf}{f}\right) \times h$

$= 50 + \left(\frac{80 - 72}{2\cancel{0}}\right) \times 1\cancel{0}$

$= 50 + \frac{8}{2}$

$= 50 + 4$

$\boxed{= 54}$

Solu: 36

(i) a spade.

$P(\text{getting a spade}) = \frac{\text{No. of spade in deck of cards}}{\text{Total no. of cards}}$

$= \frac{\cancel{13}}{\cancel{52}_{4}}$

$\boxed{= \frac{1}{4}}$

Solu: 36

(ii) $P(\text{getting a red face card}) = \frac{\text{No. of red face cards}}{\text{Total no. of cards}}$

$= \frac{\cancel{6}^{3}}{\cancel{52}_{26}}$

$\boxed{= \frac{3}{26}}$

Solu: 37

① 52 Sundays

No. of days in a non-leap year = 365

No. of ~~days~~ weeks in a non-leap year = $\frac{365}{7}$

= 52 weeks and 1 day.

Here, 52 weeks means 52 Sundays

Also, the remaining 1 day could be,

(Mon) (Tues) (Wedn) (Thurs) (Fri) (Sat) (Sun)

$P(52 \text{ Sundays}) = \frac{6}{7}$

② No. of weeks in a non-leap year = $\frac{365}{7}$

= 52 weeks and 1 day

Here, 52 weeks means 52 Sundays

Also, the remaining 1 day could be,

(Mon) (Tues) (Wed) (Thurs) (Fri) (Sat) (Sun)

$P(53 \text{ Sundays}) = \frac{1}{7}$

Section - C

Solu: 38

$p(x) = x^2 - 7 = 0$

$\therefore x^2 = 7$

$x = \pm\sqrt{7}$

The zeroes of $p(x)$ are $\sqrt{7}$ & $-\sqrt{7}$.

let, $\alpha = \sqrt{7}$ & $\beta = -\sqrt{7}$

→ Comparing $p(x)$ with std. polynomial,

we get, $a = 1$, $b = 0$, $c = -7$.

Sum of Zeroes

$\alpha + \beta = \sqrt{7} + (-\sqrt{7}) = \sqrt{7} - \sqrt{7} = 0$

By relation

$\alpha + \beta = \frac{-b}{a} = \frac{-0}{1} = 0$

→ Product of Zeroes

$\alpha \cdot \beta = (\sqrt{7})(-\sqrt{7}) = -7$

By relation

$\alpha \cdot \beta = \frac{c}{a} = \frac{-7}{1} = -7$

$\therefore$ Hence, Verified

Solu - 39

$\alpha+\beta = \frac{21}{8}$ & $\alpha \cdot \beta = \frac{5}{16}$

$\rightarrow \cancel{\alpha+\beta} \cancel{\frac{-b}{a}} = \cancel{\frac{21}{8}}$ ~~&~~ $\cancel{\alpha \cdot \beta} = \cancel{\frac{c}{a}} \cancel{\frac{5}{16}}$

$\alpha+\beta = \frac{-b}{a} = \frac{21\times 2}{8\times 2} = \frac{42}{16}$ & $\alpha \cdot \beta = \frac{c}{a} = \frac{5}{16}$

let, k be any non-zero real number,

$a = 16k$, $b = -42k$ & $c = 5k$.

$\rightarrow$ Now, quad. poly. is given,

$p(x) = ax^2 + bx + c$

$= 16kx^2 - 42kx + 5k$

$\boxed{p(x) = k(16x^2 - 42x + 5)}$ where, $k \neq 0$.

This is required quadratic polynomial.

Solu: 40

$\rightarrow S_7 = 49$

$S_{17} = 289$

$\rightarrow$ Sum of n terms:

$S_n = \frac{n}{2}[2a + (n-1)d]$

$S_7 = \frac{7}{2}[2a + (7-1)d]$

$49 = \frac{7}{2}[2a + 6d]$

$\frac{\cancel{49}^{7} \times 2}{\cancel{7}} = 2a + 6d$

$7 \times 2 = 2(a + 3d)$

$$\frac{7\times 2}{2} = a + 3d$$

$$a + 3d = 7 \quad \ldots\ldots (i)$$

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$S_{17} = \frac{17}{2}\left[2a + (17-1)d\right]$$

$$\frac{\cancel{289}^{17}\times 2}{\cancel{17}} = 2a + 16d$$

$$17\times 2 = 2(a + 8d)$$

$$\frac{17\times \cancel{2}}{\cancel{2}} = a + 8d$$

$$a + 8d = 17 \quad \ldots\ldots (ii)$$

$$\begin{array}{r} \rightarrow \cancel{a} + 3d = 17 \\ \cancel{a} + 8d = 7 \\ - \quad - \quad\quad - \\ \hline 5d = 10 \end{array}$$

$$d = 10/5$$

$$d = 2.$$

eq.(i)

$$\longrightarrow a + 3d = 7$$

$$a + 3(2) = 7$$

$$a + 6 = 7$$

$$a = 7 - 6$$

$$a = 1$$

$S_n = \frac{n}{2}[2a + (n-1)d]$

$= \frac{n}{2}[2(1) + (n-1)2]$

$= \frac{n}{2}[\cancel{2} + 2n - \cancel{2}]$

$= \frac{n}{\cancel{2}} \times \cancel{2}n$

$\boxed{\therefore S_n = n^2}$

Solu:41

$a_{10} = 52$

$a + 9d = 52 \quad \ldots \text{(i)}$

$\rightarrow a_{17} = a_{13} + 20$

$\cancel{a} + 16d = \cancel{a} + 12d + 20$

$16d - 12d = 20$

$4d = 20$

$d = \frac{20}{4}$

$d = 5$

→ Putting the value of d in eq.(i)

Eq.(i), $a + 9d = 52$

$a + 9(5) = 52$

$a + 45 = 52$

$a = 52 - 45$

$a = 7$

→ AP: 7, 12, 17, ...

n^{th} term,

$$a_n = a + (n-1)d..$$

$$a_{30} = 7 + (30-1)5$$

$$= 7 + (29)5$$

$$= 7 + 145$$

$$\boxed{a_{30} = 152}$$

Solu 42:-

$$A(5,-2) = A(x_1, y_1)$$

$$B(6,4) = B(x_2, y_2)$$

$$C(7,-2) = C(x_3, y_3)$$

Distance formula.

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(6-5)^2 + (4+2)^2}$$

$$= \sqrt{(1)^2 + (6)^2}$$

$$= \sqrt{1 + 36}$$

$$= \sqrt{37} \text{ units}$$

$$BC = \sqrt{(x_3 - x_2)^2 + (y_3 - y_2)^2}$$

$$= \sqrt{(7-6)^2 + (-2-4)^2}$$

$$= \sqrt{(1)^2 + (-6)^2}$$

$$= \sqrt{1 + 36}$$

$$= \sqrt{37} \text{ units}$$

$AC = \sqrt{(x_3 - x_1)^2 + (y_3 - y_1)^2}$

$= \sqrt{(7-5)^2 + (-2+2)^2}$

$= \sqrt{(2)^2 + (0)^2}$

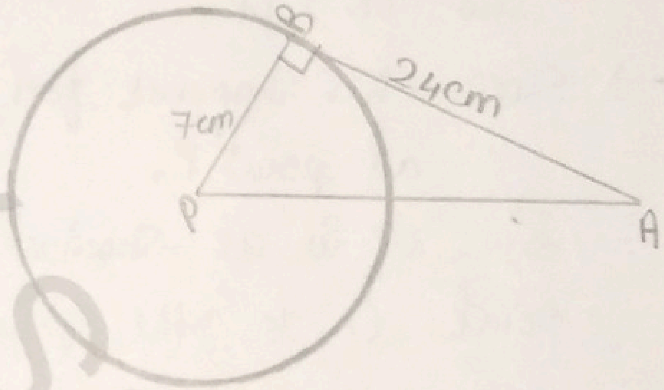
$= \sqrt{2^2}$

$AC = 2$ units

$AB = BC \neq AC$.

→ So, it is an isosceles triangle.

Solu: 43 :-



$AB = 24cm$

$PB = 7cm$

$PA = ?$

$\triangle ABP$ is a right angle triangle.

Acc. to pythagoras ~~the~~ theorem,

$PA^2 = PB^2 + AB^2$

$= (7)^2 + (24)^2$

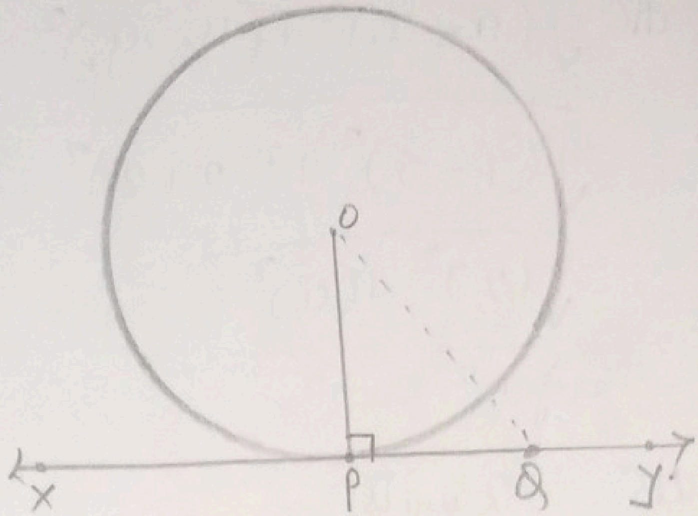
$= 49 + 576$

$PA^2 = 625$

$PA = \sqrt{625}$

$\boxed{PA = 25\ cm}$

Solu 44:-



→ Statement: The tangent at any point of a circle is perpendicular to the radius through the point of contact.

Prove: $XY \perp OP$.

Proof: We are given circle with centre O tangent $\overleftrightarrow{XY}$ to the circle at point of contact P.

→ Taking any point Q on $\overleftrightarrow{XY}$ & join OQ.

→ The point Q lie outside the circle.

So, $OQ > OP$

→ Since this happens for every point on $\overleftrightarrow{XY}$ except at point P,

So, OP is at shortest distance of all distances of the point O to the point XY.

So, OP is perpendicular to $\overleftrightarrow{XY}$

Solu 45:-

$r = 45$ cm.

→ $\theta = \frac{360°}{8} = 45°$

→ Area between two consecutive ribs,

Area of minor sector $= \frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{45}}{\cancel{360}_{\cancel{8}}} \times \frac{\overset{11}{\cancel{22}}}{7} \times 45 \times 45$

4

$$= \frac{11 \times 2025}{28}$$

$$\boxed{= \frac{22275}{28}\ cm^2}$$

Solu 46:-

Total Marbles = 24

$P(\text{Green}) = \frac{2}{3}$

→ $P(\text{green marbles}) = \frac{\text{no. of green marbles}}{\text{Total no. of marbles.}}$

$$\therefore \frac{2}{3} = \frac{n}{24}$$

$$\frac{2 \times \cancel{24}^{8}}{\cancel{3}} = n$$

$$2 \times 8 = n$$

$$16 = n$$

$$\boxed{n = 16}$$

No. of blue marbles $= 24 - n$

$= 24 - 16$

$\boxed{= 8}$.

Solu: 47

Section-D.

let, the present age of father be x years & son be y years.

→ Ten years ago,

father's age $= x-10$

Son's age $= y-10$

$(x-10) = 12(y-10)$

$x-10 = 12y-120$

$x-12y = -120+10$

$x-12y = 110$ .....(i)

→ After 10 years.

father's age $= x+10$

Son's age $= y+10$

$(x+10) = 2(y+10)$

$x+10 = 2y+20$

$x-2y = 20+10$

$x-2y = 10$ .....(ii)

$$\begin{array}{r} x-12y = -110 \\ x-2y = 10 \\ - \quad + \quad\quad - \\ \hline -10y = -120 \end{array}$$

$y = \frac{\cancel{-}12\cancel{0}}{\cancel{-}1\cancel{0}}$

$\boxed{y = 12.}$ years.

Eq (ii)

$x - 2y = 10$

$x - 2(12) = 10$

$x - 24 = 10$

$x = 10 + 24$

$\boxed{x = 34}$ years

→ The present age of father is 34 years &

Son is 12 years.

Solu 48:

→ In a cyclic quadrilateral,

opposite angles are supplementary

$\angle A + \angle C = 180^\circ$

$\therefore 4y + 20^\circ + (-4x) = 180^\circ$

$4y + 20 - 4x = 180$

$4y - 4x = 180 - 20$

$4y - 4x = 160$

$4(y - x) = 160$

$y - x = \frac{160}{4}$

$y - x = 40 \ldots (i)$

$\angle B + \angle D = 180^\circ$

$3y - 5 + (-7x + 5) = 180$

$3y \cancel{-5} - 7x \cancel{+5} = 180$

$= 3y - 7x = 180 \quad \ldots \text{(ii)}$

→ Multiplying eq(i) by 3

→ $\cancel{3y} - 3x = 120$

$\cancel{3y} - 7x = 180$

$\quad - \quad + \quad -$

$4x = -60$

$x = -60/4$

$\boxed{x = -15}$

Eq(i)

→ $y - x = 40$

$y - (-15) = 40$

$y + 15 = 40$

$y = 40 - 15$

$\boxed{y = 25^\circ}$

$\angle A = 4y + 20$

$= 4(25) + 20$

$= 100 + 20$

$= 120$

$\angle B = 3y - 5$

$= 3(25) - 5$

$= 75 - 5$

$= 70$

$\angle C = -4x = -4(-15)$

$$\boxed{= 60^\circ}$$

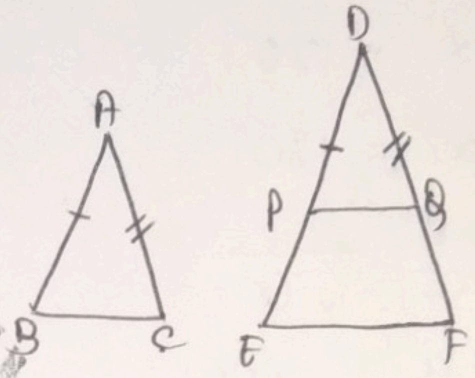
$\angle D = -7x + 5$

$= -7(-15) + 5$

$= 105 + 5$

$$\boxed{= 110^\circ}$$

Solu 49:-



Given: ΔABC & ΔDEF

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

To prove: $\angle A = \angle D$,

$\angle B = \angle E$,

$\angle E = \angle F$ &

$\Delta ABC \sim \Delta DEF$

Proof:-

let, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} < 1$ as shown in figure

Take point P on DE & Q on DF such that $DP = AB$ & $DQ = AC$ & Join PQ.

Now, $\left.\begin{aligned} \frac{AB}{DE} &= \frac{AC}{DF} \\ \frac{DP}{DE} &= \frac{DQ}{DF} \end{aligned}\right\}$ Reverse it

$\therefore \frac{DE}{DP} = \frac{DF}{DQ}$

$\therefore \frac{DE}{AB} = \frac{DF}{AC}$

$\therefore \frac{DE - DP}{DP} = \frac{DF - DQ}{DQ}$

$\therefore \frac{PE}{DP} = \frac{QF}{DQ}$

$\therefore \frac{DP}{PE} = \frac{DQ}{QF}$

$\rightarrow PQ \parallel EF$ [BPT]

$\angle P = \angle E$ & $\angle Q = \angle F$

[Corresponding angles]

In ΔDPQ & ΔDEF

$\angle P = \angle E$, $\angle Q = \angle F$, $\angle D = \angle D$

Acc. to A.A.A criteria,

$\Delta DPQ \sim \Delta DEF$.

$\rightarrow \frac{DP}{DE} = \frac{PQ}{EF} = \frac{DQ}{DF}$

$\rightarrow \frac{AB}{DF} = \frac{PQ}{EF} = \frac{AC}{DF}$

But $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

So, $\frac{PQ}{\cancel{EF}} = \frac{BC}{\cancel{EF}}$

$\therefore$ $PQ = BC$

→ In $\triangle ABC$ & $\triangle DPQ$,

$AB = DP$, $AC = DQ$, $BC = PQ$.

Acc. to SSC Criteria,

$\triangle ABC \cong \triangle DPQ$

→ $\angle A = \angle D$, $\angle B = \angle P$, $\angle C = \angle Q$ (CPCT)

$\angle B = \angle E$ & $\angle C = \angle F$.

So, $\angle A = \angle D$,

$\angle B = \angle E$,

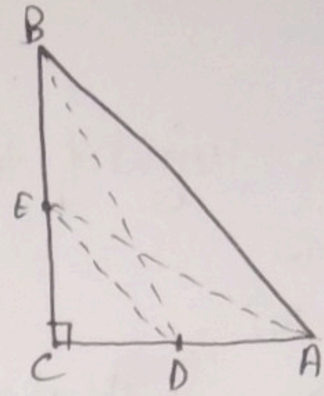
$\angle C = \angle F$.

Also $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

So, $\triangle ABC \sim \triangle DEF$

Solu 50:-

Prove : $AE^2 + BD^2 = AB^2 + DE^2$



Proof: In ΔABC, $\angle C$ is a right angle, point D lies on CA & point E lies on BC.

→ Then, All the four triangles ΔBCD, ΔBCA, ΔECD & ΔECA are right angle triangles which are right angled at $\angle C$.

→ Acc. to pythagoras theorem.

In ΔECD, $ED^2 = EC^2 + CD^2$ ----- (i)

In ΔECA, $EA^2 = EC^2 + CA^2$ ----- (ii)

In ΔBCD, $BD^2 = BC^2 + CD^2$ ----- (iii)

In ΔBCA, $AB^2 = BC^2 + AC^2$ ----- (iv)

Adding eq (ii) & (iii)

$$EA^2 + BD^2 = EC^2 + CA^2 + BC^2 + CD^2$$

$$AE^2 + BD^2 = (BC^2 + CA^2) + (EC^2 + CD^2)$$

$$AE^2 + BD^2 = AB^2 + ED^2 \text{ (from eq (i) \& (iv))}$$

Thus, $AE^2 + BD^2 = AB^2 + DE^2$ //

Hence proved.

Soln 51 :-

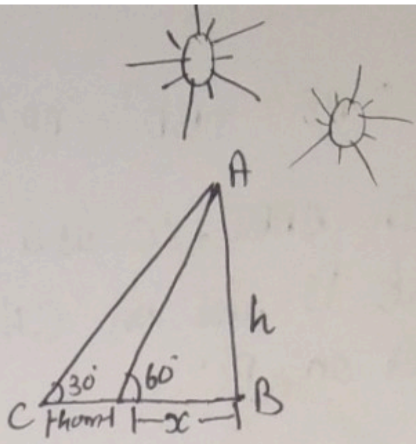
→ $AB = h$ = Height of tower = ?

$\angle D = 60°$

$\angle C = 30°$

$BD = x\,m$ = lenght of shadow (at $60°$)

$BC = x + 40$ = length of shadow (at $30°$)



In ΔABD,

$$\tan D = \frac{AB}{BD}$$

$$\tan 60° = \frac{h}{x}$$

$$\sqrt{3} = \frac{h}{x}$$

$$x = \frac{h}{\sqrt{3}}\ m$$

→ In ΔABC,

$$\tan C = \frac{AB}{BC}$$

$$\tan 30° = \frac{h}{x+40}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{x+40}$$

$$x + 40 = \sqrt{3}\,h$$

$$\frac{h}{\sqrt{3}} + 40 = \sqrt{3}\,h$$

$$\frac{h+40\sqrt{3}}{\sqrt{3}} = \sqrt{3}h$$

$$h+40\sqrt{3} = 3h$$

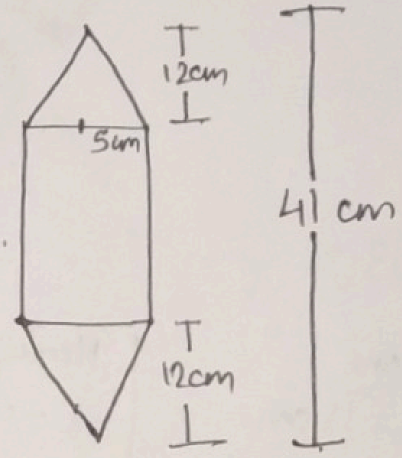
$$40\sqrt{3} = 3h-h$$

$$40\sqrt{3} = 2h$$

$$\frac{40\sqrt{3}}{2} = h \therefore 20\sqrt{3} = h \quad \boxed{\therefore h = 20\sqrt{3}\,m}$$

Hence, Height of tower is $20\sqrt{3}$ m.

Solu - 52 :-



→ Cylinder.

$r = 5cm$

$h = 41-12-12$

$= 41-24$

$= 17$ cm

→ Cone

$r = 5cm$

$h' = 12$ cm

Slant Height, $l = \sqrt{r^2 + h'^2}$

$= \sqrt{(5)^2 + (12)^2}$

$= \sqrt{25+144}$

$= \sqrt{169}$

$\boxed{l = 13cm}$

T.S.A of Article = C.S.A of cylinder + 2 × C.S.A of Cone

$= 2\pi r h + 2 \times \pi r h$

$= 2\pi r (h + l)$

$= 2 \times 3.14 \times 5 \ (17 + 13)$

$= \dfrac{\cancel{2} \times 314 \times \cancel{5}}{\cancel{100}_{5}} \times 3\cancel{0}$

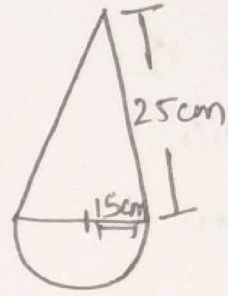
$\cancel{= 314 \times 5}$

$= 314 \times 3$

$\boxed{= 942 \ cm^2}$

Solu53 :-

Cone	Hemisphere
$r = 15$ cm	$r = 15$ cm
$l = 25$ cm	



→ Height of Cone,

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

$(25)^2 = (15)^2 + h^2$

$625 = 225 + h^2$

$625 - 225 = h^2$

$400 = h^2$

$h^2 = 400$

$h = \sqrt{400}$

$\boxed{h = 20 \text{ cm}}$

Volume of Solid = Vol. of cone + Vol. of Hemisphere.

$$= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$$

$$= \frac{\pi r^2}{3}[h + 2r]$$

$$= \frac{3.14 \times 15 \times \cancel{15}^{5}}{\cancel{3}} \times [20 + 2 \times 15]$$

$$= 3.14 \times 75 \times 20 + 30$$

$$= 3.14 \times 75 \times 50$$

$$= \frac{\cancel{314}^{157}}{\cancel{100}_{2}} \times 75 \times \cancel{50}$$

$$= 157 \times 75$$

$$\boxed{= 11775 \text{ cm}^2.}$$

Solu 54:

class interval	No. of workers (f_i)	Class mark (x_i)	$d_i = x_i - A$	$u_i = \frac{x_i - A}{h}$	$f_i u_i$
15 - 35	17	25	-40	-2	-34
35 - 55	f_1	45	-20	-1	$-f_1$
55 - 75	32	A = 65	0	0	0
75 - 95	f_2	85	20	1	f_2
95 - 115	19	105	40	2	38
	$\Sigma f_i = 100$				$f_2 - f_1 + 4$

$$f_1 + f_2 = 68 + 100$$

$$f_1 + f_2 = 100 - 68$$

$$f_1 + f_2 = 32.$$

$$\bar{x} = A + \left(\frac{\Sigma f_i w_i}{\Sigma f_i}\right) \times h$$

$A = 65$

$\Sigma f_i w_i = f_2 - f_1 + 4$

$f_i = 100$

$h = 20$

$\bar{x} = 65$

$$65 = 65 + \left(\frac{f_2 - f_1 + 4}{\cancel{100}\,5}\right) \cancel{20}$$

$$65 - 65 = \frac{f_2 - f_1 + 4}{5}$$

$$0 = \frac{f_2 - f_1 + 4}{5}$$

$$0 = f_2 - f_1 + 4$$

$$-4 = f_2 - f_1$$

$$f_2 - f_1 = -4$$

elimination method.

$$\cancel{f_1} + f_2 = 32$$
$$\cancel{-f_1} + f_2 = -4$$

$$2f_2 = 28$$

$$f_2 = \frac{28}{2}$$

$$f_2 = 14$$

$$f_1 + f_2 = 32$$

$$f_1 + 14 = 32$$

$$f_1 = 32 - 14$$

$$\boxed{f_1 = 18.}$$