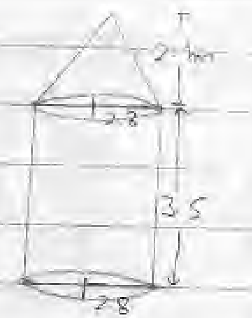
Section D

21) We have-



Radius of cylindrical and conical base = 2.8m.

Height of cylinder = 3.5m.

Height of conical part = 2.1 m

Slant height of conical part = $\sqrt{h^2+r^2}$

$\Rightarrow \sqrt{(2.8)^2+(2.1)^2} \Rightarrow \sqrt{7.84+4.41}$

$l \Rightarrow \sqrt{12.25m^2} \Rightarrow l = 3.5m$

Total canvas required to make 1 tent = C.S.A of cylinder + C.S.A of cone

$\Rightarrow 2\pi rh + \pi rl$

$\Rightarrow \pi r(2h+l) \Rightarrow \frac{22}{7} \times 2.8 (2\times3.5+3.5) m^2$

$\Rightarrow (22 \times .4 \times (7+3.5)) m^2 \Rightarrow (8.8 \times 10.5) m^2$

$\Rightarrow 92.4\ m^2$

Canvas required to make 1500 such tent

$= 92.4 \times 1500$

$138600.0 m^2 = 138600 m^2$

Total cost of making tent @ ₹ 120/m^2

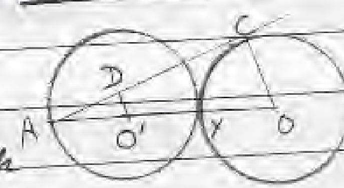
$\Rightarrow$ ₹ 120×138600

Amount shared by each school when there are 50 school : $\dfrac{12\cancel{0} \times 138600}{5\cancel{0}}$

₹ 12×27720

$=$ ₹ $\boxed{332640}$

Value - $\boxed{\text{"Help the needy"}}$.



22). We have -

Two equal circles, O & O', touching each other at X and $O'D \perp AC$.

To find $= \dfrac{DO'}{CO}$

Let radius of each circle $= r$

In $\triangle ADO'$ & $\triangle ACO$ -

$\angle A = \angle A$ (common)

$\angle ADO' = \angle ACO$ (each $90°$)

$\Rightarrow \triangle ADO' \sim \triangle ACO$ by AA similarity

By c.p.c.t. $\frac{AO'}{AO} = \frac{O'D}{OC} = \frac{AD}{AC}$

($AO' = r$ & $AO = 3r$)

$\Rightarrow \frac{r}{3r} = \frac{O'D}{OC} \Rightarrow \frac{1}{3} = \frac{DO'}{CO}$

Ans:- $\boxed{\frac{DO'}{CO} = \frac{1}{3}}$

23) We have-

Total possible outcome = 1, 2, 3, 4 & 1, 4, 9, 16 = 16

	1	2	3	4
1	1	2	3	4
4	4	8	12	16
9	9	18	27	36
16	16	32	48	64

Total favourable event, having product less than 16

$= 9+1, 2, 3, 4, 4, 8, 12 = 7+1 = 8$

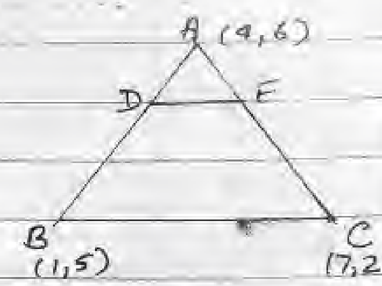
Probability = $\frac{\text{Favourable (event) outcome}}{\text{Total event}}$

$P[E] = \frac{7+1}{16} = \frac{8}{16} = \frac{1}{2}$

Ans:- $\boxed{\frac{1}{2}}$

24) The vertices of ΔABC are –

$A(4,6)$; $B(1,5)$; $C(7,2)$



Area of ΔABC (by cross method)

$$\Rightarrow \begin{array}{cccc} x_1 & x_2 & x_3 & x_1 \\ y_1 & y_2 & y_3 & y_1 \end{array}$$

$$\Rightarrow \frac{1}{2}\left[(x_2y_1 + x_3y_2 + x_1y_3) - (x_1y_2 + x_2y_3 + x_3y_1)\right.$$

$$\Rightarrow \begin{array}{cccc} 4 & 1 & 7 & 4 \\ 6 & 5 & 2 & 6 \end{array}$$

Area of $\Delta ABC = \frac{1}{2}\left[(6+35+8)-(20+2+42)\right]$

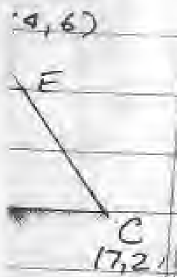
$$\Rightarrow \frac{1}{2}\left[49-(64)\right] = \frac{1}{2}\left|-15\right| = \frac{15}{2} \text{ unit}^2$$

We have – $\frac{AD}{DB} = \frac{1}{3} \Rightarrow \frac{AD}{AD+DB} = \frac{1}{3}$

$$\Rightarrow 3AD = AD + DB$$

$$2AD = DB \Rightarrow \frac{AD}{DB} = \frac{1}{2}$$

$AD : DB = 1:2$, Similarily $AE : EC = 1:2$



By section formula — $\dfrac{mx_2+nx_1}{m+n}$ & $\dfrac{my_2+ny_1}{m+n}$

$D(x,y) \Rightarrow \quad x = \dfrac{1+2\times 4}{3}$ & $y = \dfrac{1\times 5+2\times 6}{3}$

$x = \dfrac{9}{3} = 3$ & $y = \dfrac{17}{3}$

$E(x_1,y_1) = x_1 = \dfrac{1\times 7+2\times 4}{3}$ & $y_1 = \dfrac{1\times 2+2\times 6}{3}$

$x_1 = \dfrac{7+8}{3}$ & $y_1 = \dfrac{2+12}{3}$

$x_1 = 5$ & $y_1 = \dfrac{14}{3}$

Area of ΔADE by cross method —

$$\begin{array}{cccc} A & D & E & A \\ 4 & 3 & 5 & 4 \\ 6 & \frac{17}{3} & \frac{14}{3} & 6 \end{array}$$

Area

$$= \frac{1}{2}\left[\left(18 + \frac{85}{3} + \frac{56}{3}\right) - \left(\frac{68}{3} + \frac{14}{1} + \frac{30}{1}\right)\right]$$

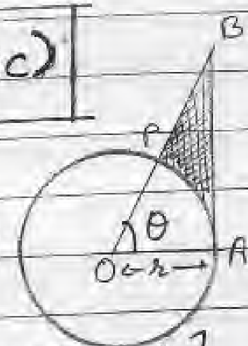
$$= \frac{1}{2}\left[\left(\frac{54+85+56}{3}\right) - \left(\frac{68+42+90}{3}\right)\right]$$

$\frac{5}{2}$ unit^2

$$\frac{1}{2}\left[\left(\frac{195}{3}-\frac{200}{3}\right)\right] \Rightarrow \frac{1}{2}\left|\frac{-5}{3}\right| = \frac{1\times5}{2\times3} = \frac{5}{6}\text{ unit}^2$$

$$\frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \frac{\frac{1}{2}\times\frac{5}{3}}{\frac{1}{2}\times15} \Rightarrow \frac{5}{3\times15} \Rightarrow \frac{1}{9}$$

$$\boxed{ar(\Delta ADE) = \frac{1}{9}(ar\,\Delta ABC)}$$



25) Given – OAP is sector of circle with centre O, $\angle POA = \theta$ and $OA \perp AB$

To prove –
Perimetre of shaded region $= r\left[\tan\theta + \sec\theta + \frac{\pi\theta}{180} - 1\right]$

Proof –
Perimetre of shaded region $= BP + AB + \text{ar } \widehat{AP}$ — (IV)
$= (\theta)$

Now –
$\tan\theta = \frac{AB}{r} \Rightarrow r\tan\theta = AB$ —— (1)

$\sec\theta = \frac{OB}{r} \Rightarrow r\sec\theta = OB$

$OB - OP = BP \Rightarrow r\sec\theta - r = BP$ — (2)

$\frac{5}{6}$ unit^2

Length of arc AP $= \frac{\theta}{360} \times 2\pi r = \frac{\theta \times 2\pi r}{360} = \frac{\theta\pi r}{180}$ — ③

Putting value from eq ①, ②, ③ in eq IV

⇒ Perimetre of shaded region

$$\Rightarrow r\tan\theta + r\sec\theta - r + \frac{\theta\pi r}{180}$$

$$= \boxed{r\left[\tan\theta + \sec\theta + \frac{\theta\pi}{180} - 1\right]}$$

Hence proved.

— IV

26) The houses are numbered consecutively from 1 to 49

1 2 3 ...... $x-1$, x, $x+1$ ...... 49.

Sum of no. of house preceding X numbered house

= Sum of no. following X

$$\Rightarrow \frac{x-1}{2}\left[1 + (x-1)\right] = \left[(1 + \dots 49) - \left[1+2+\dots x\right]\right]$$

$$\Rightarrow \frac{x-1}{2}\left[1+x-1\right] = \left[\frac{49}{2} \times (1+49) - \left[\frac{x}{2}(1+x)\right]\right]$$

$$\frac{(x-1)x}{2} = \frac{49 \times 50}{2} - \frac{x}{2}(x+1)$$

$$\frac{x(x-1)}{2} + \frac{(x+1)x}{2} = 49 \times 25$$

$$\frac{x^2 \cancel{-x} + x^2 \cancel{+x}}{2} = 49 \times 25$$

$$\frac{\cancel{2}x^2}{\cancel{2}} = 49 \times 25 \Rightarrow x^2 = 7 \times 7 \times 5 \times 5$$

$$x = 35$$

35, being whole no, proved that, given statement is true for $\boxed{x = 35}$

27) Let speed of stream = x

speed of boat = 24 km/h

A.T.Q. —

$$\frac{32}{24-x} + \frac{32}{24+x} = 1$$

"Sorry Sir/Mam"

$$\Rightarrow 32\left[\frac{1}{24-x} + \frac{1}{24+x}\right] = 1$$

$$\Rightarrow \frac{24+x+(24-x)}{576-x^2} = \frac{1}{32}$$

A.T.Q. —

$$\frac{32}{24-x} - \frac{32}{24+x} = 1$$

$$32\left[\frac{1}{24-x} - \frac{1}{24+x}\right] = 1$$

$$32\left[\frac{24+x-24+x}{576-x^2}\right] = 1$$

$$32(\cancel{24}+x-\cancel{24}+x) = 576 - x^2$$

$$32 \times 2x = 576 - x^2$$

$$64x = 576 - x^2$$

$$x^2 + 64x - 576 = 0$$

$$x^2 + 72x - 8x - 576 = 0 \Rightarrow x^2 + 72x - 8x - 576 = 0$$

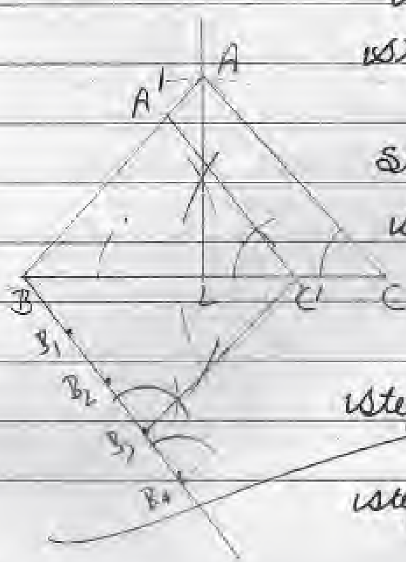
$$x(x+72) - 8(x+72) = 0$$

$$(x-8)(x+72) = 0$$

$$x = 8, -72$$

Speed can't   speed of stream = 8 km/h.

28) Step of Construction



Step 1 – Draw base BC = 5.5cm, with AL = 3cm ⊥r on it

Step 2 – Join AB & AC.

Step 3 – Draw acute angle XBC & mark 4 point ($B_1 \cdots B_4$) at equal distance. Join B_4C.

Step 4 – From B_3, draw a ∥ line to B_4C that meet BC at C'

Step 5 – From C' draw ∥ AC, that meet AB at A'

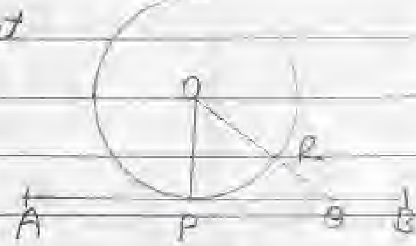
$\triangle A'BC'$ is required $\triangle$

atement

= 1

= 1

29) Given – A circle $C(O, OP)$ and tangent at P.



To prove – $OP \perp PQ$

Const^n – Extend OR to Q, at AB

Proof – We have –

$$OP = OR \text{ (radius)}$$

$$OQ = OR + RQ$$

Clearly $OQ > OR$

$\therefore OQ > OP$

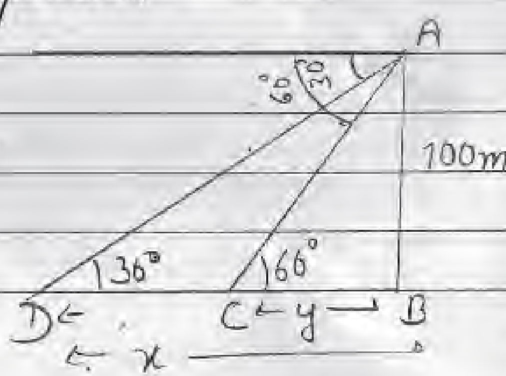
The shortest line joining a point to any point on given line is $\perp$r to that line

$\Rightarrow OP \perp AB$

or $\boxed{OP \perp PQ}$

Hence proved

30) ATQ →



In $\triangle ABC$, $\angle ACB = 60°$

$\tan 60° = \sqrt{3}$

$\Rightarrow \dfrac{100}{BC} = \sqrt{3}$

$\frac{100}{\sqrt{3}} = BC = y$

In Δ ABD, $\angle ADB = 30°$

$\tan 30° = \frac{1}{\sqrt{3}} \Rightarrow \frac{AB}{BD} = \frac{1}{\sqrt{3}} \Rightarrow \frac{100}{BD} = \frac{1}{\sqrt{3}}$

$100\sqrt{3} = BD = \cancel{y}\ x$

Required distance travelled by ship $= -(y - x) = x - y$

$\Rightarrow 100\sqrt{3} - \frac{100}{\sqrt{3}}$ m

$x - y \Rightarrow 100\left[\sqrt{3} - \frac{1}{\sqrt{3}}\right] = 100\left[\frac{3-1}{\sqrt{3}}\right] = \frac{100 \times 2}{\sqrt{3}}$

$CD = x - y \Rightarrow 100 \times \frac{2 \times \sqrt{3}}{\sqrt{3}\ \sqrt{3}} = \frac{200\sqrt{3}}{3}$ m

$CD = \frac{200 \times 1.73 \text{ m}}{3} = \frac{346}{3}$ m

$\Rightarrow \boxed{115.33 \text{ m}}$

31) Let length of park = x

Its breadth = $x-3$

Area = $x(x-3)\ m^2$

Base of isoceles Δ = $x-3$

and altitude = $12\ m$

Its area = $\frac{1}{2} \times (12 \times x-3) m^2 = 6(x-3)\ m^2$

A.T.Q →

$$+x(x-3) = 6(x-3) \cancel{+4} + 4$$

$$x^2 - 3x = 6x - 18 + 4$$

$$x^2 - 3x = 6x - 14$$

$$x^2 - 3x - 6x + 14 = 0$$

$$x^2 - 9x + 14 = 0$$

$$x^2 - 7x - 2x + 14 = 0 \quad \text{(By Factorisation Method)}$$

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

$$x = 2, 7$$

Length of rectangle field = $7\ m$

& breadth = $(7-3)\ m = 4\ m$

(Length can't be 2, because ~~if~~ then breadth = -1, that isn't possible).

Ans:- $\boxed{7\ m,\ 4\ m \text{ respectively}}$

Section C-

11) Given- The point $P(x, y)$ is equidistant from point $A[(a+b), b-a]$ & $B[(a-b), (a+b)]$

To prove = $bx = ay$

Proof-

$$AP = BP \Rightarrow AP^2 = BP^2$$

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

$$AP^2 = BP^2$$

$$\Rightarrow [x-(a+b)]^2 + [y-(b-a)]^2 = [x-(a-b)]^2 + [y-(a+b)]^2$$

$$\Rightarrow \cancel{x^2} + \cancel{(a+b)^2} - 2x(a+b) + \cancel{y^2} + (b-a)^2 - 2y(b-a)$$

$$= \cancel{x^2} + (a-b)^2 - 2x(a-b) + \cancel{y^2} + \cancel{(a+b)^2} - 2y(a+b)$$

hod)

$$(b-a)^2 - 2x(a+b) + 2y(a-b) = (a-b)^2 - 2x(a-b) - 2y(a+b)$$

$$\cancel{b^2} + \cancel{a^2} - 2\cancel{b}a - 2a\cancel{x} - 2bx + 2ay - 2\cancel{by} = \cancel{a^2} + \cancel{b^2} - \cancel{2ab} - \cancel{2ax} + 2bx - 2ay + 2\cancel{by}$$

$$= 4ay = 4bx$$

$$\boxed{ay = bx}$$

Hence proved

12) Radius & height of conical vessel = 5 cm & 24 cm resp.

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

Volume of cone = $\frac{1}{3}\pi \times 25 \times 24$ cm^3

Water is emptied of cylindrical vessel of $r = 10$ cm & height = h

Volume of cone = Volume of cylinder

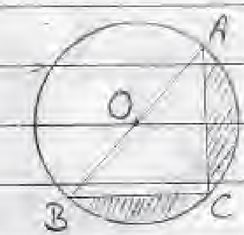
$\Rightarrow \frac{1}{\cancel{3}} \cancel{\pi} \times 25 \times \overset{8}{\cancel{24}} = \cancel{\pi} \times 10 \times 10 \times h$

$= \frac{200}{100}$ cm = h

$= \boxed{2 \text{ cm} = h}$

{ Volume of –
Cone = $\frac{1}{3}\pi r^2 h$
Cylinder = $\pi r^2 h$ }

13) AIQ –



Radius of semicircle ACB = $\frac{13}{2}$ cm.

area of semicircle = $\pi r^2 \times \frac{1}{2}$

Its area = $\frac{1}{2} \times 3.14 \times \frac{13}{2} \times \frac{13}{2}$ cm^2

$\frac{3.14 \times 169}{8} cm^2 = \frac{530.66}{8} cm^2$

semicircle subtend 90° at circle, $\angle ACB = 90^\circ$

In Δ ABC —

$AC^2 + BC^2 = AB^2 \Rightarrow 12^2 + BC^2 = 169\ cm^2$

$\Rightarrow BC^2 = (169 - 144)\ cm^2 \quad BC^2 = 25 cm$

$BC = 5\ cm.$

Area of $\Delta = \frac{1}{2} \times$ Base $\times$ Height

Area of Δ ABC $= \frac{1}{2} \times AC \times BC = \frac{1}{\cancel{2}} \times \overset{6}{\cancel{12}} \times 5 = 30\ cm^2$

Area of shaded region $= \frac{530.66}{8} cm^2 - 30\ cm^2$

$\Rightarrow (66.3325 - 30)\ cm^2$

$\Rightarrow \boxed{36.3325\ cm^2}$

14) Diametre of sphere = 12 cm

Its radius = 6cm

Volume $= \frac{4}{3}\pi \times 6^3\ cm^3$ $\left\{ \text{Volume of sphere } = \frac{4}{3}\pi r^3 \right\}$

It is submerged into water, in cylindrical vessel, then water level rise by $3\frac{5}{9}$ cm $= \frac{32}{9}$ cm

Volume submerged = Volume rise.

Let radius of cylinder be r cm

$\Rightarrow \frac{4}{\cancel{3}}\cancel{\pi} \times 6^3 = \cancel{\pi} \times r^2 \times \frac{32}{\cancel{9}\,3}$ cm

$\frac{\cancel{216}\,27 \times 3 \times 4}{\cancel{32}\,4} = r^2$

$\Rightarrow 4 \times \frac{27 \times 3}{4} = r^2 \Rightarrow 4 \times \frac{81}{4} cm^2 = r^2$

$r = \frac{9}{\cancel{4}}$ cm

Diametre $= 2r = \cancel{2} \times \frac{9}{\cancel{4}}$ cm $= 9$ cm $\times 2 = \boxed{18 \text{ cm}}$

15) Radius of cylinder as well as conical part $= \frac{3}{2}$ m.

Height of cylinder, $h = 2.1$ m

Slant height of cone, $l = 2.8$ m.

Total canvas required $= 2\pi rh + \pi rl$

$\pi r(2h + l)$

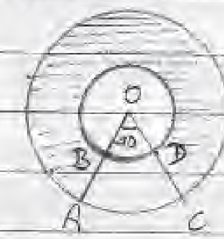
$\Rightarrow \frac{22}{7} \times \frac{3}{2}\left[4.2 + 2.8\right] m^2$

$\Rightarrow \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \frac{3}{\cancel{2}} \times 7.0\ m^2 = 33\ m^2$

Total cost @ ₹500/m^2 = ₹33 × 500

$\boxed{₹16{,}500}$

16) Radii of two concentric circle = 7cm & 14cm
and ∠AOC = 40°



$m\angle AOC = 360° - 40° = 320°$

Area of shaded region

$\frac{\theta}{360}\pi\left[R^2 - r^2\right]$

$\Rightarrow \frac{320}{360} \times \frac{22}{7}\left[14^2 - 7^2\right] \Rightarrow \frac{8 \times 22 \times \cancel{7} \times \cancel{21}^{\,7}}{\cancel{9}_{3}\ \ \cancel{7}}$

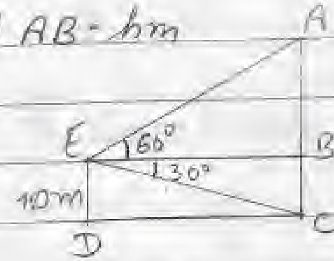
$\Rightarrow \frac{8 \times 154\ cm^2}{3}$

Required area = $\frac{1232\ cm^2}{3}$

$= \boxed{410.67\ cm^2}$

cm

17) Let AC = be height of hill and AB = h m



In Δ BCE,

where BC = 10 m & $\angle BEC = 30^\circ$

$$\tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\Rightarrow \frac{BC}{BE} = \frac{1}{\sqrt{3}} \Rightarrow \frac{10}{BE} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow 10\sqrt{3}\,m = BE = CD$$

Distance of hill from ship = $10\sqrt{3}\,m = 10 \times 1.732\,m$

$= 17.32\,m$

In Δ ABE, where AB = h m, BE = $10\sqrt{3}$ m & $\angle AEB = 60^\circ$

$$\tan 60^\circ = \sqrt{3}$$

$$\Rightarrow \frac{h}{10\sqrt{3}} = \sqrt{3} \Rightarrow h = 10\sqrt{3} \times \sqrt{3}$$

$$h = 30\,m$$

Height of hill = h + 10m

$\boxed{40\,m}$

18) Let three digit of 3 digit no be - $a-d, a, a+d$.

Their sum = 15

$a-d+a+a+d = 15 \Rightarrow 3a = 15 \Rightarrow a = 5$

Required 3 digit no = $100(a-d)+10a+a+d$

$100a-100d+10a+a+d$

$111a-99d$

No obtained by reversing digit = $100(a+d)+10a+a-d$

$100a+100d+10a+a-d$

$111a+99d$

A.T.Q. -

$111a+99d = 111a-99d-594$

$\Rightarrow 594 = \cancel{111a}-99d-\cancel{111a}-99d$

$594 = -198d$

$\frac{-594}{198} = d$

$\Rightarrow -3 = d$.

The no = $111a-99d$

$111 \times 5 - 99 \times -3$

$555+297 = 852$

No. $\Rightarrow$ $\boxed{852 \text{ or } 258}$

19) $(a-b)x^2+(b-c)x+(c-a)=0$

The root are equal, then $D=0$

Comparing eq^n by $ax^2+bx+c=0$

$a=(a-b)$; $b=(b-c)$; $c=c-a$

$D = b^2-4ac$

$= (b-c)^2-4\times(a-b)(c-a)$

Here, $D = 0$

$(b-c)^2-4(a-b)(c-a) = 0$

$b^2+c^2-2bc-4(ac-a^2-bc+ab) = 0$

$b^2+c^2-2bc-4ac+4a^2+4bc-4ab = 0$

$4a^2+b^2+c^2+2bc-4ab-4ac = 0$

$\Rightarrow (-2a+b+c)^2 = 0$ $\quad [a^2+b^2+c^2+2ab+2bc+2ca=(a+b+c)^2]$

$-2a+b+c = 0$

$\boxed{b+c = 2a}$

Hence proved

20) Total cards $= 52$

Cards removed $= 6$

Card left $= 52-6 = 46$

Total black king = 2.

Probability of drawing black king = $\frac{2}{46} = \boxed{\frac{1}{23}}$

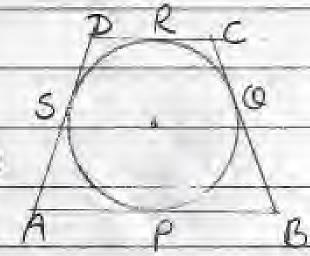
Total red card = 26 − 6.
= 20

Probability of drawing red colour card = $\frac{20}{46} = \boxed{\frac{10}{23}}$

Total card of black colour = 26

Probability of drawing black colour card = $\frac{26}{46} = \boxed{\frac{13}{23}}$

Section B



5 Given — A quadrilateral circumscribing a circle, with centre O, such that it touches side AB, BC, CD, AD at P, Q, R & S

To prove = AB + CD = BC + DA

Proof — Length of tangent drawn from external point are equal

AP = AS — (at A) —— ①

BP = BQ → (at B) —— ②

DR = DS → (at C) —— ③

CR = CQ → at D —— ④

Adding eq ①, ②, ③, ④

$\Rightarrow AP + BP + DR + CR = AS + DS + BQ + CQ$

$$\boxed{AB + CD = AD + BC}$$

Hence proved.

6) We have,

$a_4 = 0$

$a + 3d = 0$ $[a + (n-1)d = a_n]$

$3d = -a$

or $-3d = a$ —— ①

Now,

$a_{25} = a + 24d$ $[a+(n-1)d = a_n]$

$-3d + 24d$ (Putting value of "a" from eq ①)

$= 21d$ —— ②

$a_{11} = a + 10d$

$-3d + 10d$

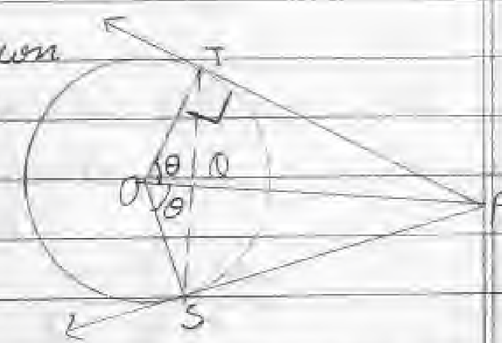
$= 7d$ —— ③ $(a = -3d)$

From eq ② & eq ③

$$\boxed{a_{25} = 3a_{11}}$$

Hence Proved.

7) Given PT & PS are two tangent drawn from P to circle C (O, r) & OP = 2r



To prove = $\angle OTS = \angle OST = 30°$

Proof —

In ΔOPT,

Let $\angle TOP = \theta$

$$\cos\theta = \frac{OT}{OP} = \frac{r}{2r}$$

$$\cos\theta = \frac{\text{Base}}{\text{Hypotenuse}}$$

$$\cos\theta = \frac{1}{2}$$

Also $\cos 60° = \frac{1}{2}$, then

$$\theta = 60°$$

similarity, $\angle SOP = 60°$, and $\angle SOT = 120°$

In ΔOST,

Applying ~~(Pyth)~~ angle sum property of Δ -

$$\angle OTS + \angle OST + \angle TOS = 180°$$

$$\angle OTS + \angle OST = 180° - \angle TOS$$

$$\angle OTS + \angle OST = 60°$$

Since $OT = OS$ (radius of circle) $\Rightarrow \angle OTS = \angle OST$

$\Rightarrow 2\angle OST = 60° \Rightarrow \angle OST = 30$

$\cancel{\Rightarrow \angle OTS = \angle OST = 30°}$

Hence Proved.

1 of (1)

8)- Let $A = (3,0)$; $B = (6,4)$ and $C = (-1,3)$.

Applying distance formula -

$AB = \sqrt{(6-3)^2+(4-0)^2} = \sqrt{3^2+4^2} = \sqrt{25} = 5$ unit

$BC = \sqrt{(6+1)^2+(4-3)^2} = \sqrt{7^2+1^2} = \sqrt{49+1} = \sqrt{50} = 5\sqrt{2}$ unit

$AC = \sqrt{(3+1)^2+(0-3)^2} = \sqrt{25} = 5$ unit.

Since,

$AB = AC = 5$ unit

ΔABC is isosceles triangle.

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

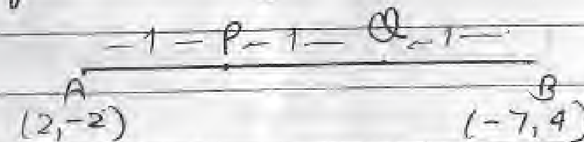
$\Rightarrow 5^2 + 5^2 = 50$

$25 + 25 = 50 = BC^2 = (5\sqrt{2})^2 \Rightarrow AB^2 + AC^2 = BC^2$

Hence, by converse of Pythagoras Theorem,

$\Rightarrow \Delta ABC$ is right angled triangle.

9) We have -



Line AB, joining points $A(2,-2)$ and $B(-7,4)$

$5\sqrt{2}$ unit

P & Q are points of trisection, then,

P ~~dividio~~ divides AB in ratio 1:2 & Q in ratio 2:1

By section formula —

$$x = \frac{mx_2 + nx_1}{m+n} \quad \& \quad y = \frac{my_2 + ny_1}{m+n}$$

$$P(x, y) = \frac{1 \times -7 + 2 \times 2}{3} \quad \text{and} \quad y = \frac{1 \times 4 + 2 \times -2}{3}$$

$$P(x, y) = \frac{-7+4}{3} \quad \text{and} \quad \frac{4-4}{3}$$

$$\boxed{P(x, y) = (-1, 0)}$$

C^2

$$Q(x', y') = \frac{2 \times -7 + 1 \times 2}{3} \quad \text{and} \quad y = \frac{2 \times 4 + 1 \times -2}{3}$$

$$Q(x', y') = \frac{-14+2}{3} \quad \text{and} \quad \frac{8-2}{3}$$

$$\boxed{Q(x'y') = (-4, 2)}$$

B

(?, 4)

16) $\sqrt{2x+9} + x = 13$

$\sqrt{2x+9} = 13 - x$

$2x+9 = (13-x)^2 \Rightarrow$

$2x+9 = 169 + x^2 - 26x \Rightarrow x^2 + 169 - 26x - 9 - 2x$

$\Rightarrow 169 + x^2 - 2x - 26 - 9$

$x^2 - 2x - 26 + 169 - 9 = 0$

$x^2 - 2x - 26 + 160 = 0$

$x^2 - 2x + 134 = 0$

$x^2 - 28x + 160 = 0$

$x^2 - 20x - 8x + 160 = 0$

$x(x-20) - 8(x-20) = 0$

$(x-8)(x-20) = 0$

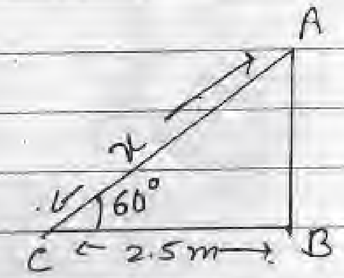
either = $\boxed{x = 8}$ or $\boxed{x = 20}$

Section A

1) In ΔABC, with $\angle C = 60^\circ$

Let length of ladder $= x = AC$

$\cos 60^\circ = \frac{1}{2}$



$\Rightarrow \frac{2.5}{AC} = \frac{1}{2} = 2 \times 2.5 = AC$

$\Rightarrow \boxed{5m = AC}$

2). We have-

Three consecutive terms of AP = $k+9,\ 2k-1,\ 2k+7$

~~them~~ Then,

$$(k+9)+(2k+7) = 2(2k-1) \qquad \{(a+c=2b)\}$$

$$\Rightarrow k+9+2k+7 = 4k-2$$

$$3k+16 = 4k-2$$

$$16+2 = 4k-3k$$

$$\boxed{18 = k}$$

3) We have-

$$\angle CAB = 30^\circ$$

since, $OA = OC$ (radius of circle)

$$\angle OAC = \angle OCA = 30^\circ$$

Line joining centre to tangent is perpendicular on tangent

$$\angle OCP = 90^\circ$$

$$\angle PCA = \angle OCP - \angle OCA$$

$$\Rightarrow 90^\circ - 30^\circ$$

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

4) Total cards = 52

(b) Total red card & queen = 28

Probability of getting neither red card nor queen

$$= 1 - \frac{28}{52} = \frac{52-28}{52}$$

$$= \frac{24}{52} = \frac{12}{26}$$

Ans:- $\frac{12}{26}$ or $\boxed{\frac{6}{13}}$

1

$\frac{90}{90}$ 009130519

90

Ninety only

Excellent!

04/4/0296