JINDAL SCHOOL

BASIC MATHEMATICS

MOCK-TEST : 2025

1. Prime factorization of $2025 = 3^4 \times 5^2$

$\therefore$ Exponent of 3 is 4.

$\therefore$ option (iv)

2. $2025x + 2024y = -1$

$\underline{\overset{(-)}{}2024x \overset{(-)}{+} 2025y \overset{(-)}{=} 1}$

$\Rightarrow \boxed{x - y = -2}$

$\therefore$ option (ii)

3. Polynomials having zeroes -2 and 5 are

$K\{x^2 - (\text{sum of zeroes})x + (\text{product of zeroes})\}$; $K \neq 0$

$= K\{x^2 - (-2+5)x + (-2)(5)\}$; $K \neq 0$

$= K(x^2 - 3x - 15)$; $K \neq 0$.

Hence there are infinite ~~no~~ of polynomials.

$\therefore$ option (iv)

4. Since $(x+2)(x-1) = x^2 - 2x - 3 \Rightarrow x^2 + x - 2 = x^2 - 2x - 3 \Rightarrow 3x + 1 = 0$

not a quadratic equation.

$\therefore$ option (iii)

5. Given $2x$, $x+10$ and $3x+2$ are three consecutive terms of an AP.

So $2(x+10) = 2x + 3x + 2$ $\therefore$ option (i)

$\Rightarrow 2x + 20 = 5x + 2$

$\Rightarrow 3x = 18 \Rightarrow \boxed{x = 6}$

6.

$1+2+3+\cdots+50 = 25K$

$\Rightarrow \dfrac{50\times 51}{2} = 25K$

$\Rightarrow 50\times 51 = 50K$

$\Rightarrow \boxed{K = 51}$

$\therefore$ option (ii)

7.

$A = (\cos 30^\circ, \sin 30^\circ) = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$B = (\cos 60^\circ, -\sin 60^\circ) = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

$\therefore AB = \sqrt{\left(\frac{\sqrt{3}}{2}-\frac{1}{2}\right)^2 + \left(\frac{1}{2}-\left(-\frac{\sqrt{3}}{2}\right)\right)^2} = \frac{1}{2}\sqrt{(\sqrt{3}-1)^2+(\sqrt{3}+1)^2}$

$= \frac{1}{2}\sqrt{2\left((\sqrt{3})^2+1^2\right)} = \sqrt{2}$

$\therefore$ option (iv)

8.

$A = (-3, 5)$

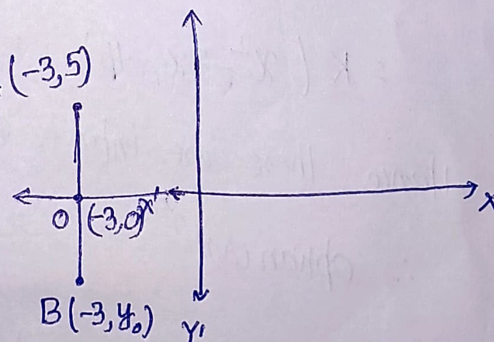
About x-axis ~~B~~mirror image of A is $B = (-3, y_0)$

where $O = (-3, 0)$ mid point of AB.

So $0 = \dfrac{5+y_0}{2} \Rightarrow \boxed{y_0 = -5}$

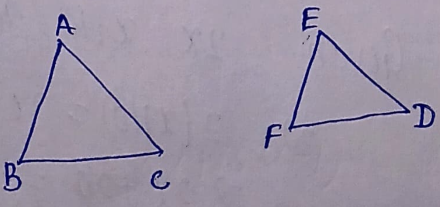
$\therefore B = (-3, -5)$

$\therefore$ option (iii)



9.

Since $\dfrac{AB}{EF} = \dfrac{AC}{DE}$

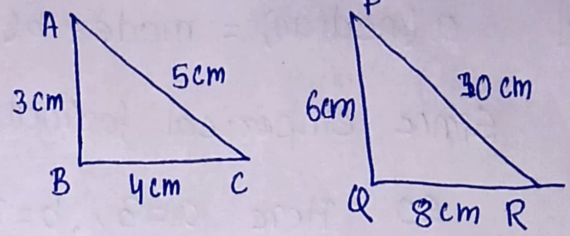


Then $\triangle ABC \sim \triangle EFD$

iff $\angle A = \angle E$ $\therefore$ option (ii)

10.

If $\triangle ABC \sim \triangle PQR$



then $\dfrac{AB}{PQ} = \dfrac{AC}{PR} = \dfrac{BC}{QR} = \dfrac{5}{10}$

$= \dfrac{1}{2}$

$\therefore PQ = 2AB = 6\,cm$

$QR = 2BC = 8\,cm$

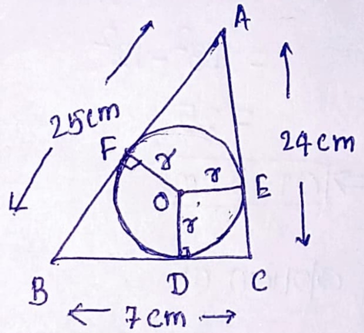
$\therefore$ Perimeter of $\triangle PQR = PQ + QR + PR$

$= 6 + 8 + 10 = 24\,cm.$

$\therefore$ option (ii)

11.

Here $\triangle ABC$ is a RAT



$p = 24$, $b = 7$ and $h = 25$

So by using relation

$r = \dfrac{p+b-h}{2}$

$= \dfrac{24+7-25}{2}$

$\Rightarrow \boxed{r = 3\,cm}$

$\therefore$ option (i)

12.

Since $\operatorname{cosec}^2 x - \cot^2 x = 1$

$\Rightarrow \boxed{\cot^2 x - \operatorname{cosec}^2 x = -1}$

$\therefore$ option (ii)

13.

Here N = ~~maximum~~ sum of frequency = 11 + 12 + 13 + 9 + 11 = 56

~~So, median clas~~ So, $\frac{N}{2} = 28$

I	0-5	5-10	10-25	15-20	20-25
f	11	12	13	9	11
cf	11	23	36	45	56

28 lies in c.f 36.

So median class = 10-25

upper limit = 15

$\therefore$ option (iii)

14. $a(\text{median}) = \text{mode} + b(\text{mean})$

Since empirical formula is 3 median = mode + 2 mean

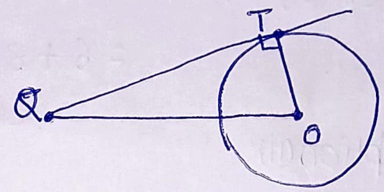
So Here $a=3$, $b=2$

$\therefore 2b+3a = 2(2)+3(3) = 13$

$\therefore$ option (iii)

15. Since $QT = 12$ cm

$QO = 13$ cm



So $OT^2 = OQ^2 - TQ^2$

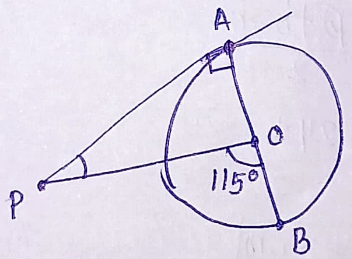
$= 13^2 - 12^2$

$= 25$

$\Rightarrow \boxed{OT = 5 \text{ cm}}$

$\therefore$ option (ii)

16. Since



In $\triangle OPA$

$\angle POB = \angle OPA + \angle OAP$

Exterior adjacent angle

= sum of two non adjacent interior angle.

$\Rightarrow 115 = \angle OPA + 90°$ (As $OA \perp AP$)

$\Rightarrow \boxed{\angle OPA = 25°}$

$\therefore$ option (i)

17. ATQ $\dfrac{2\pi r_1}{2\pi r_2} = \dfrac{4}{3} \Rightarrow \dfrac{r_1}{r_2} = \dfrac{4}{3}$ where r_1 and r_2 are radii of two circles.

$\Rightarrow \dfrac{r_1^2}{r_2^2} = \dfrac{16}{9} \Rightarrow \dfrac{\pi r_1^2}{\pi r_2^2} = \dfrac{16}{9}$ $\therefore$ option (iv)

18. ~~An~~ P(Event is most unlikely to happen) = Value near to zero
= 0.0001 (Here)

$\therefore$ option (i)

19. Option (a)

20. A: $P(HH) = \dfrac{n(\{HH\})}{n(S)} = \dfrac{1}{4}$

R: P(Success ~~Events~~) = P(Failure) = 1/2 P.

$\therefore$ option (d)

SECTION-B

21. (a) $2 \times 5 \times 7 \times 11 + 11 \times 13$

$= 11 \times (2 \times 5 \times 7 + 13)$, which is divisible by 11 ~~and~~ 363, 1 and itself.

Hence it is a composite.

(b) Prime factorization of $306 = 2 \times 3^2 \times 17$

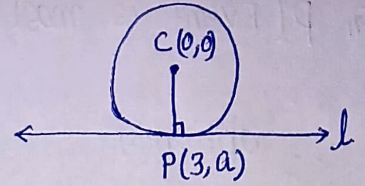
and $657 = 3^2 \times 73$

$\therefore$ LCM (306, 657) $= 2 \times 3^2 \times 17 \times 73$

$= 34 \times 657 = 22338$

Hence 22338 is the smallest number which is divisible by both 306 and 657.

22. Given tangent $l: x+y=5$
Centre $C=(0,0)$ and tangent at point $P=(3,a)$



Since P lies on l, so it satisfies the line eq^n.

i.e., $3+a=5 \Rightarrow \boxed{a=2}$

So radius $= CP = \sqrt{(3-0)^2+(2-0)^2} = \sqrt{13}$

Hence radius of the circle is $\sqrt{13}$ unit

23. Given 2 and -3 are zeroes of $x^2+(a+1)x+b$.

So sum of roots $= -\dfrac{\text{Coefficient of } x}{\text{coefficient of } x^2}$

$\Rightarrow 2-3 = -\dfrac{(a+1)}{1}$

$\Rightarrow a+1 = 1$

$\Rightarrow \boxed{a=0}$

product of roots $= \dfrac{\cancel{\text{Coefficient}}\ \text{Constant}}{\text{Coefficient of } x^2}$

$\Rightarrow 2(-3) = \dfrac{b}{1}$

$\Rightarrow \boxed{b=-6}$

Hence $a=0$ and $b=-6$.

24. Given quadratic equation $x^2+4x-3\sqrt{2}=0$
Here $a=1$, $b=4$, $c=-3\sqrt{2}$
Discriminent $(D) = b^2-4ac = 4^2-4(1)(-3\sqrt{2}) = 16+12\sqrt{2} > 0$.
Hence two roots are real and distinct.

25. (a) $2\sin 30^\circ \cdot \tan 60^\circ - 3\cos^2 60^\circ \cdot \sec^2 30^\circ$

$= 2\left(\frac{1}{2}\right)(\sqrt{3}) - 3\left(\frac{1}{2}\right)^2 \cdot \left(\frac{2}{\sqrt{3}}\right)^2$

$= \sqrt{3} - \frac{1}{3}$

(b) Given $\sin x = 7/25$

Consider $\sin x \cdot \cos x\,(\tan x + \cot x)$

$= \sin x \cdot \cos x \left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}\right)$

$= \sin x \cdot \cos x \; \frac{\sin^2 x + \cos^2 x}{\sin x \cdot \cos x}$

$= 1.$ (as $\sin^2 x + \cos^2 x = 1$ for all x)

$\boxed{\text{SECTION-C}}$

26. Suppose $\sqrt{2}$ is a rational number.

then $\sqrt{2} = \frac{p}{q}$ where $HCF(p,q) = 1$

$\Rightarrow 2q^2 = p^2$ ——— (i)

$\Rightarrow 2 \mid p^2$

$\Rightarrow 2 \mid p$ ——— (ii)

$\Rightarrow p = 2m$ for some integer m.

From (i) $2q^2 = (2m)^2$

$\Rightarrow q^2 = 2m^2$

$\Rightarrow 2 \mid q^2$

$\Rightarrow 2 \mid q$ ——— (iii)

$\Rightarrow$ ~~q≠2~~ From (ii) and (iii) 2 is a common factor of both p and q. So $HCF(p,q) \geq 2$ which is contradict to the fact that $HCF(p,q) = 1$.

Hence $\sqrt{2}$ is an irrational number.

27.(a)

Area of land (in hect)	1-3	3-5	5-7	7-9	9-11	11-13
No of family (f)	20	45	80	55	40	12

Here maximum frequency = 80

∴ modal class = 5 - 7

h = length of modal class = 2
l = lower limit of the modal class = 5
f_1 = frequency of the modal class = 80
f_0 = preceding frequency of the modal class = 45
f_2 = suceeding frequency of the modal class = 55

So mode for grouped frequency

$$\text{mode} = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$$

$$= 5 + \frac{80 - 45}{2(80) - 45 - 55} \times 2$$

$$= 5 + \frac{35}{60} \times 2$$

$$= 5 + \frac{35}{30} = 5 + 1.106$$

$$\Rightarrow \boxed{\text{mode} = 6.106}$$

27(b)

CI	f	x	x-a	$u = \frac{x-a}{h}$	uf
0-20	7	10	-40	-2	-14
20-40	p	30	-20	-1	-p
40-60	10	50	0	0	0
60-80	9	70	20	1	9
80-100	13	90	40	2	26

Here assumed mean (a) = 50

h = ~~interval~~ interval length = 20

Given $\bar{x} = 54$

$\therefore \Sigma uf = -14 - p + 0 + 9 + 26 = 21 - p$

$\Sigma f = 7 + p + 10 + 9 + 13 = 39 + p$

$\therefore$ By step deviation method

$$\bar{x} = a + \frac{\Sigma fu}{\Sigma f} \times h$$

$$\Rightarrow 54 = 50 + \frac{21-p}{39+p} \times 20$$

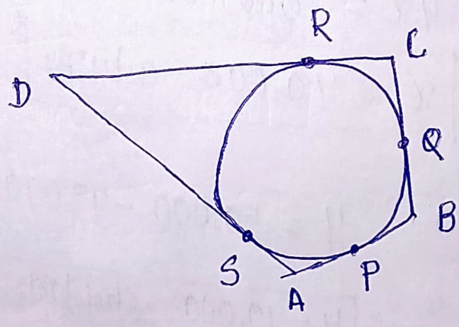
$$\Rightarrow \frac{420 - 20p}{39+p} = 4$$

$$\Rightarrow 420 - 20p = 156 + 4p$$

$$\Rightarrow 264 = 24p$$

$$\Rightarrow \boxed{p = 11}$$

28. A quadrilateral ABCD circumscribed a circle as given in this figure.



Since CD, AB, BC, and AD are tangent to the circle

So, DR = DS, CR = CQ, BQ = BP, AP = AS

(As tangent drawn from a external point to a circle have same length)

~~Consider~~

Consider CD + AB = (CR + DR) + (BP + AP)

= (CQ + DS) + (BQ + AS)

= (CQ + BQ) + (DS + AS)

= BC + DA

$\Rightarrow \boxed{\frac{CD+AB}{AD+BC}=1}$ ▨.

29. (A) Let $x=$ number of adult in the match
$y=$ number of children in the match

ATQ, $x+y=50000$ —— (i)

Cost of adult ticket ₹1000
Cost of children ticket = ₹200

So $1000x+200y=4{,}20{,}00000$

$\Rightarrow 5x+y=2{,}10{,}000$

$\Rightarrow 4x+x+y=2{,}10{,}000$

$\Rightarrow 4x+50{,}000=2{,}10{,}000$

$\Rightarrow 4x=1{,}60{,}000$

$\Rightarrow \boxed{x=40{,}000 \text{ adults}}$

From (i) $y=50{,}000-40{,}000$

$\Rightarrow \boxed{y=10{,}000 \text{ childrens}}$

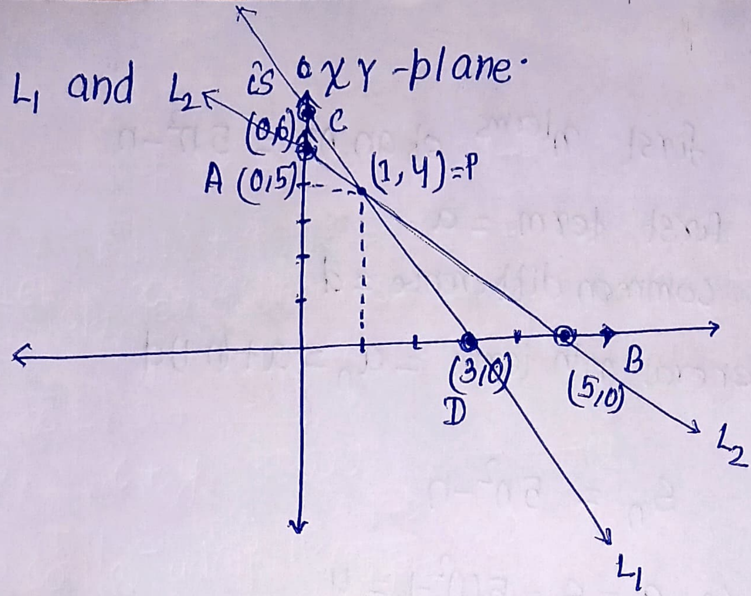
Hence 40,000 adults and 10,000 childrens atteneds the cricket match.

(B). Consider $L_1: 2x+y=6$ and $L_2: x+y=5$

x	0	3
y	6	0

x	0	5
y	5	0

Draw L_1 and L_2 is xy-plane.



Here $A = (0,5)$, $B = (5,0)$

$C = (0,6)$, $D = (3,0)$

L_1 and L_2 intersect at $P = (1,4)$.

Hence $x = 1$ and $y = 4$.

$\boxed{30.}$ Consider $(\sin x - \cos x + 1)(\sec x - \tan x)$

$= (\sin x - \cos x + 1)\left(\dfrac{1 - \sin x}{\cos x}\right)$

$= ((1 + \sin x) - \cos x)\dfrac{(1 - \sin x)}{\cos x}$

$= \dfrac{(1 - \sin^2 x) - \cos x(1 - \sin x)}{\cos x}$

$= \dfrac{\cos^2 x - \cos x(1 - \sin x)}{\cos x}$

$= \cos x - (1 - \sin x)$

$= \cos x + \sin x - 1$

Hence $(\sin x - \cos x + 1)(\sec x - \tan x) = (\sin x + \cos x - 1)$

31

Sum of first $n$terms of an AP $= 5n^2 - n$

Let first term $= a$

common difference $= d$

general nth term $= a_n = a + (n-1)d$

ATQ $S_n = 5n^2 - n$

So, $a = S_1 = 5(1)^2 - 1 = 4$

Now $S_n = 5n^2 - n$

$\Rightarrow \frac{n}{2}[a + a_n] = 5n^2 - n$

$\Rightarrow a + a_n = 5n - 1$

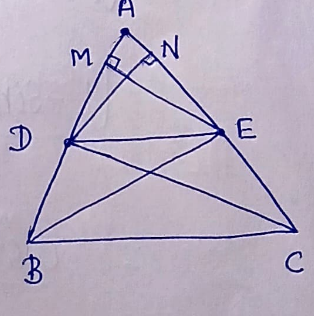
$\Rightarrow a_n = 5n - 1 - 4$

$\Rightarrow \boxed{a_n = 5(n-1)}$

Hence n^{th} term of an A.P is $5(n-1)$.

SECTION-D

32. In a triangle ABC, $DE \parallel BC$.



Join BE and DC

Draw $EM \perp AD$ and $DN \perp AE$

$[ADE] = \frac{1}{2} \times AD \times EM$ —— (i)

and also

$[ADE] = \frac{1}{2} \times AE \times DN$ —— (ii)

from (i) and (ii) $AD \times EM = AE \times DN$

$\Rightarrow \boxed{\dfrac{AD}{AE} = \dfrac{DN}{EM}}$ ——— (iii)

Since DE ∥ BC

~~Let h = height (i.e. distance between DE and BC)~~

DE as a common base, and ΔBDE and Δ CDE between BE and BC.

So $[BDE] = [CDE]$

$\Rightarrow [ADE] + [BDE] = [ADE] + [CDE]$

$\Rightarrow [ABE] = [ADC]$

$\Rightarrow \frac{1}{2} \times AB \times EM = \frac{1}{2} \times AC \times DN$

$\Rightarrow \boxed{\dfrac{AB}{AC} = \dfrac{DN}{EM}}$ ——— (iv)

From (iii) and (iv)

$$\frac{AD}{AE} = \frac{AB}{AC}$$

$$\Rightarrow \frac{AD}{AB} = \frac{AE}{AC}$$

$$\Rightarrow \frac{AD+BD}{AD} = \frac{AE+EC}{AE}$$

$$\Rightarrow 1 + \frac{BD}{AD} = 1 + \frac{EC}{AE}$$

$$\Rightarrow \frac{BD}{AD} = \frac{EC}{AE}$$

$$\Rightarrow \boxed{\frac{AD}{DB} = \frac{AE}{EC}}$$

33. (a) Let original fraction is $\frac{x}{y}$ where x and y are integer.

Given $x = y - 3$ $\therefore \dfrac{x}{y} = \dfrac{x}{x+3}$ ——— (i)

$\Rightarrow \boxed{y - x = 3}$ ——— (ii)

Again ATQ, $\frac{x+2}{x+3+2} + \frac{x}{x+3} = \frac{29}{20}$

$$\Rightarrow \frac{x^2+5x+6+x^2+5x}{x^2+8x+15} = \frac{29}{20}$$

$$\Rightarrow 40x^2+200x+120 = 29x^2+232x+435$$

$$\Rightarrow 11x^2-32x-315=0$$

$$\Rightarrow 11x^2-77x+45x-315=0$$

$$\Rightarrow 11x(x-7)+45(x-7)=0$$

$$\Rightarrow (11x+45)(x-7)=0$$

$\Rightarrow \boxed{x=7}$ only possible.

So original fraction is $\frac{x}{x+3} = \frac{7}{10}$.

33(b). A train covers distance $= 300$ km

Speed of the train $=$ 'v' km/h

time taken $=$ 't' hours

Then $vt = 300$ km —— (i)

again ATQ, $(v+5)(t-2) = 300$

$$\Rightarrow vt+5t-2v-10=300$$

$$\Rightarrow 5t-2v=10$$

$$\Rightarrow t = \frac{10+2v}{5} \Rightarrow \boxed{2+\frac{2}{5}v = t}$$

from (i) $\quad v\left(2+\frac{2}{5}v\right) = 300$

$$\Rightarrow 10v+2v^2 = 1500$$

$\Rightarrow v^2 + 5v = 750 = 0$

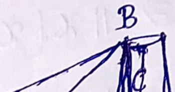
$\Rightarrow v^2 + 30v - 25v - 750 = 0$

$\Rightarrow v(v+30) - 25(v+30) = 0$

$\Rightarrow (v-25)(v+30) = 0$

$\Rightarrow \boxed{v = 25 \text{ km/h}}$

Hence original speed of the train is 25 km/h.

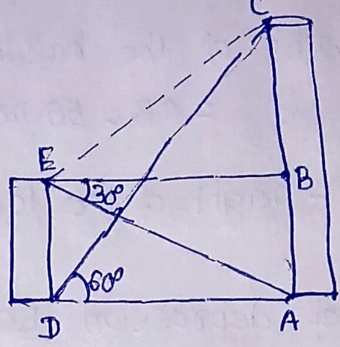


34. ATQ,

Height of tower = ED = 40' m.

Height of chimney = AC = AB + BC

= 40 + BC m.



Angle of depression = $\angle BEA = 30°$

Angle of elevation = $\angle ADC = 60°$

length of wire tied = EC

In $\triangle ABE$, $\tan 30° = \frac{AB}{EB}$

$\Rightarrow EB = \frac{40}{1/\sqrt{3}} \Rightarrow \boxed{BE = 40\sqrt{3} \text{ m.}}$

Since $AD = BE = 40\sqrt{3}$ m.

In $\triangle ADC$, $\tan 60° = \frac{AC}{AD}$

$\Rightarrow AC = AD \tan 60°$

$= 40\sqrt{3} \times \sqrt{3}$

$\Rightarrow \boxed{AC = 120 \text{ m.}}$

Again $BC = AC - AB = 120 - 40$

$\Rightarrow \boxed{BC = 80 \text{ m.}}$

So, in $\triangle EBC$, ~~RATtem~~ $EC = \sqrt{BC^2 + BE^2}$

$\Rightarrow EC = \sqrt{80^2 + (40\sqrt{3})^2}$

$= \sqrt{6400 + 4800}$

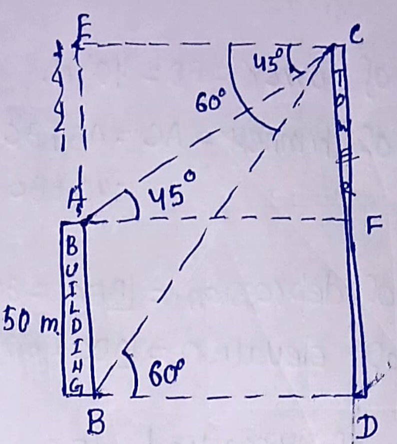
$= \sqrt{11200}$

$\Rightarrow \boxed{EC = 40\sqrt{7} \text{ m.}}$

Hence Height of chimney is 120 m. and length of wire tied is $40\sqrt{7}$ m.

34.(b) Height of the building

$= AB = 50\ m.$



$EB = CD =$ height of the tower

Angle of depression $\angle ECA = 45°$

and $\angle ECB = 60°$

In $\triangle ECB$, $\tan 60° = \frac{BE}{CE}$

$\Rightarrow \sqrt{3} = \frac{BA + AE}{CE} = \frac{50 + AE}{CE}$

$\Rightarrow \boxed{\sqrt{3}CE = 50 + AE}$ --- (i)

Again in $\triangle AEC$, $\tan 45° = \frac{AE}{CE}$

$\Rightarrow 1 = \frac{AE}{CE}$

$\Rightarrow \boxed{AE = CE}$

$\therefore$ From (i) $\sqrt{3}AE = 50 + AE$

$\Rightarrow (\sqrt{3}-1) AE = 50$

$\Rightarrow AE = \frac{50}{\sqrt{3}-1}$

$\Rightarrow AE = \frac{50}{3-1}(\sqrt{3}+1) \Rightarrow \boxed{AE = 25(\sqrt{3}+1)}$

$\therefore EB = EA + AB = 25(\sqrt{3}+1) + 50$

$= 25(\sqrt{3}+3)$

Hence height of the tower $= EB = 25(\sqrt{3}+3)$

and distance between tower and building is $25(\sqrt{3}+1)$.

35.

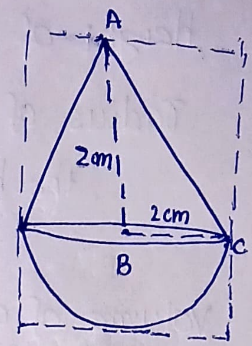
Height of the cone = AB = 2 cm

Radius of the cone (r) = BC = 2 cm

$\therefore$ Height of the cylinder = h = AB + r

= 2+2

$\Rightarrow \boxed{h = 4cm}$



Volume of the toy = Volume of the cone + Volume of the hemisphere

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

$= \frac{1}{3} \times \frac{22}{7} \times 2^2 \, (2+4)$

$= 8 \times \frac{22}{7} = \frac{176}{7} \ cm^3$

Volume of the cylinder $= \pi r^2 h$

$= \frac{22}{7} \times 2^2 \times 4$

$= \frac{352}{7} \ cm^3$

Difference of their volume = Volume of the cylinder − Volume of the toy

$= \frac{352}{7} - \frac{176}{7}$

$= \frac{176}{7} \ cm^3 . = 8 \times \frac{22}{7} \ cm^3$

~~≈ 25.14 cm³~~ .

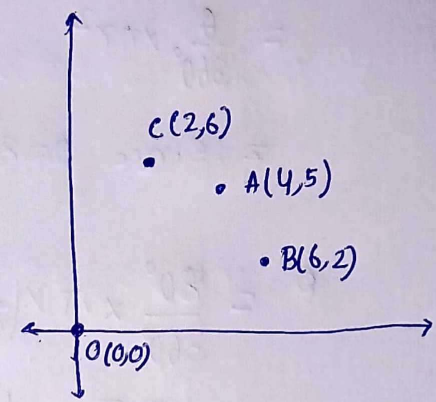
$= 8\pi \ cm^3$

$= 8 \times 3.14 \ cm^3$

$= 25.12 \ cm^3$

SECTION-E

36. Three friends Amar, Bhavin and Chetanya live in societies A(4,5), B(6,2) and C(2,6) respectively.
Their office located at O(0,0).



(i) Distance between B and C

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

(By distance formula)

(ii) Mid-point of B and C $= \left(\frac{6+2}{2}, \frac{2+6}{2}\right) = (4, 4)$

So Bhavin and Chetanya will meet at point (4,4).

(iii) (a) $OC = \sqrt{2^2+6^2} = 2\sqrt{10}$ units

$OA = \sqrt{4^2+5^2} = \sqrt{41}$ units

$OB = \sqrt{6^2+2^2} = 2\sqrt{10}$ units

$\therefore$ A(4,5) is the farthest from the office at a $\sqrt{41}$ units distance.

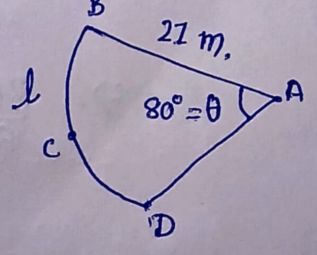
(iii) (b) ~~$OB = \sqrt{6^2+2^2} = 2\sqrt{10}$ units~~ $AB = \sqrt{(4-6)^2+(5-2)^2} = \sqrt{13}$ unit

~~$OC = \sqrt{2^2+6^2} = 2\sqrt{10}$ units~~ $AC = \sqrt{(2-4)^2+(6-5)^2} = \sqrt{5}$ unit

$\therefore$ C(2,6) is nearest to A and at $\sqrt{5}$ unit distance.

37. Given arc length BCD = l m.

AB = 21 m and $\angle BAD = 80^\circ$
(which is complement of 10°)



(i) Area Cover by the Sector BADC

$= \frac{\theta}{360^\circ} \times \pi r^2$

Since $\theta = 80^\circ$ and $r = \frac{l}{\theta} = \frac{l}{80^\circ}$

$= \frac{80^\circ}{360^\circ} \times \pi \times \left(\frac{l}{80}\right)^2$

$= \frac{2\pi}{360^\circ} \times \frac{l^2}{160^\circ} = \frac{l^2}{160^\circ}\ m^2$

(ii) Area of the watered region $= \frac{\theta}{360^\circ} \times \pi r^2$

$= \frac{80^\circ}{360^\circ} \times \pi \times 21^2$

$= \frac{2}{9} \times \pi \times 21 \times 21$

A. $= 98\pi\ m^2$

(iii) If radius = 28 m

Then new Area $(A') = \frac{\theta}{360^\circ} \times \pi \times 28^2$

Since $A = A'$

$\Rightarrow 98\pi = \frac{\theta}{360^\circ} \times \pi \times 28 \times 28$

$\Rightarrow 0.125 = \frac{\theta}{360^\circ} \times 16$

$\Rightarrow \frac{360^\circ}{8} = \theta \Rightarrow \boxed{\theta = 45^\circ}$

(iii) (B) $A'' = r = 28$ m and $\theta = 80^\circ$

Then new Area $A'' = \frac{\theta}{360^\circ} \times \pi r^2$

$= \frac{80^\circ}{360^\circ} \times \pi \times 28 \times 28$

$= \frac{2}{9} \times \pi \times 28 \times 28$

$= \frac{1568}{9} \pi \text{ m}^3$

Difference in Area $= A'' - A'$

$= \frac{1568}{9}\pi - 98\pi$

$= \frac{686}{9}\pi \text{ m}^3$.

Hence increase in water region is $76.22\,\pi \text{ m}^3$.

38. (a) (i) Given $O^- = x\%$

$O^+ = 30\%$

$A^- = 8\%$

$A^+ = 24\%$

$B^- = 6\%$

$B^+ = 18\%$

$AB^- = 1$

$AB^+ = 3$

(i) since whole percentage $= 100$

$\Rightarrow x + 30 + 8 + 24 + 6 + 18 + 1 + 3 = 100$

$\Rightarrow 90 + x = 100$

$\Rightarrow \boxed{x = 10}$ ie. $\boxed{x = 10\%}$

(ii) E = Selected person has a Rhesus negative

$n(E) = 10 + 8 + 6 + 1 = 25$

$n(S) = 100$

so $P(E) = \frac{n(E)}{n(S)} = \frac{25}{100} = \frac{1}{4}$

Hence Probabicty of Rhesus negative is $1/4$.

(iii) (b) $E' =$ neither ~~Univer~~ AB^- nor O^-

$n(E') = 100 - (1 + 10) = 89$

$n(S) = 100$

$\therefore P(E') = \frac{n(E')}{n(S)} = \frac{89}{100} = 0.89$

Hence probability of a selected person to be neither Universal recipient nor universal donor is 0.89.

← END →

(iii) (a) $E'' =$ Rhesus positive but neither blood type A nor B.

$n(E'') = 30 + 3 = 33$

$P(E'') = \frac{n(E'')}{n(S)} = \frac{33}{100} = 0.33$.

Hence probablity of a person from is Rhesus positive but neither type A nor B is 0.33.

← END →