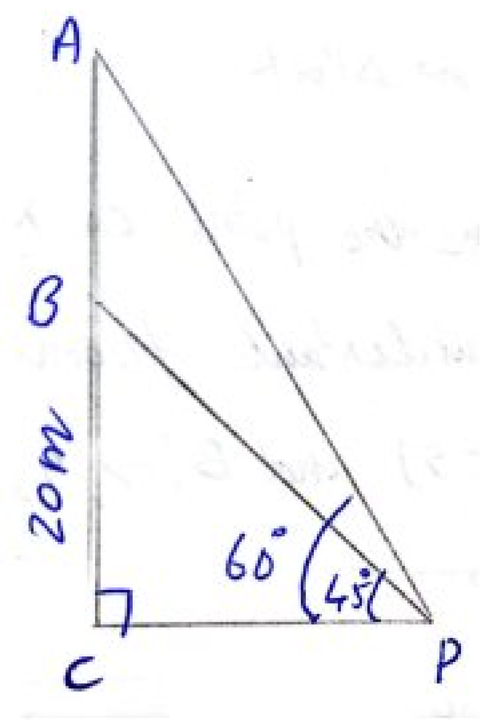
GRAND TEST PRINCIPLES OF VALUATION
CLASS 10 MATHEMATICS 2024-2025

1. A
2. A
3. B
4. Let cost of each bat= Rs. x

   Cost of each ball=Rs. y

   $7x + 6y = Rs. 3800\ ; 3x + 5y = Rs. 1750$
5. $\left(\frac{1}{2}\right)^2 + k\left(\frac{1}{2}\right) - \frac{5}{4} = 0 \Rightarrow \frac{1}{4} + \frac{k}{2} - \frac{5}{4} = 0 \Rightarrow \frac{k}{2} - \frac{4}{4} = 0 \Rightarrow \frac{k}{2} = 1 \Rightarrow k = 2$
6. D
7. 18
8. B

9.

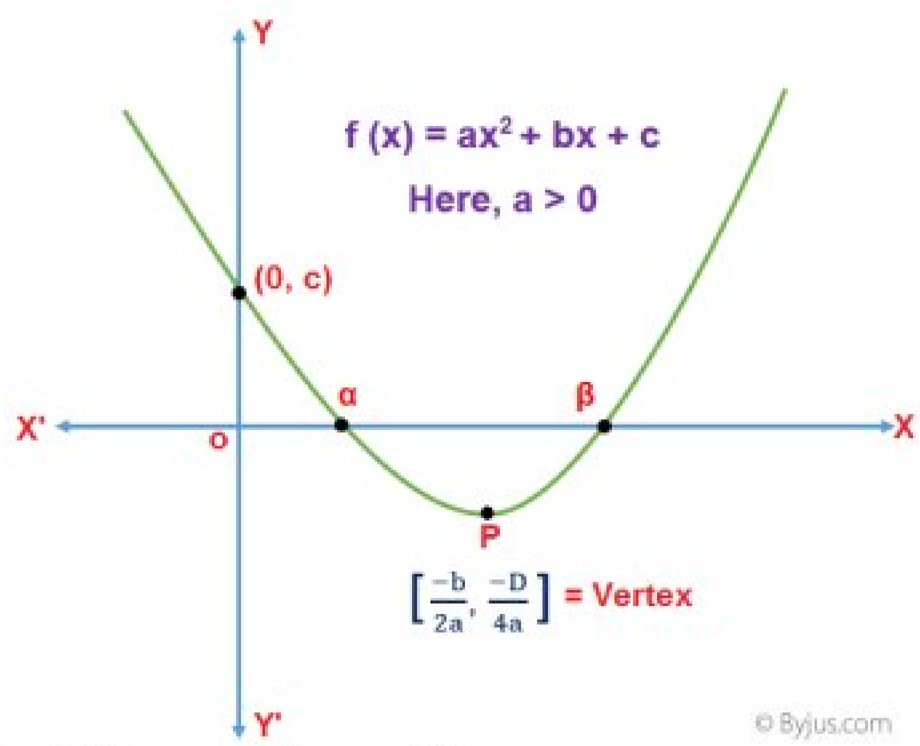


10.2

11. CSA of cone and CSA of Hemi Sphere

12. 1

13.



14.$(x + 1)^2 = 2(x - 3)$

$\Rightarrow x^2 + 2x + 1 = 2x - 6$

$\Rightarrow x^2 + 7 = 0$

Which is in the form of $ax^2 + bx + c = 0, a \neq 0.$

Hence it is a quadratic equation

15. i) A.A.A

   ii) $\Delta ABC \sim \Delta PQR$

16. Let P(x,0) be any point on x -axis.

   Given, P(x,0) is equidistant from point A (2, −5) and B (−2,9)

   ∴AP=BP

$\Rightarrow\sqrt{(x-2)2+(0+5)2=(x+2)2+(0-9)2}$

Squaring both sides, we have

$(x-2)^2+25=(x+2)^2+81$

$\Rightarrow x^2+4-4x+25=x^2+4+4x+81$

$\Rightarrow -8x=56$

$\therefore x=56-8=-7$

∴ The point on the x -axis equidistant from given points is (-7,0)

17. $\tan(A+B)=\sqrt{3}=tan60°$

$\Rightarrow A+B=60°$.............................(1)

$\tan(A-B)=\frac{1}{\sqrt{3}}=tan30°$

$\Rightarrow A-B=30°$..............................(2)

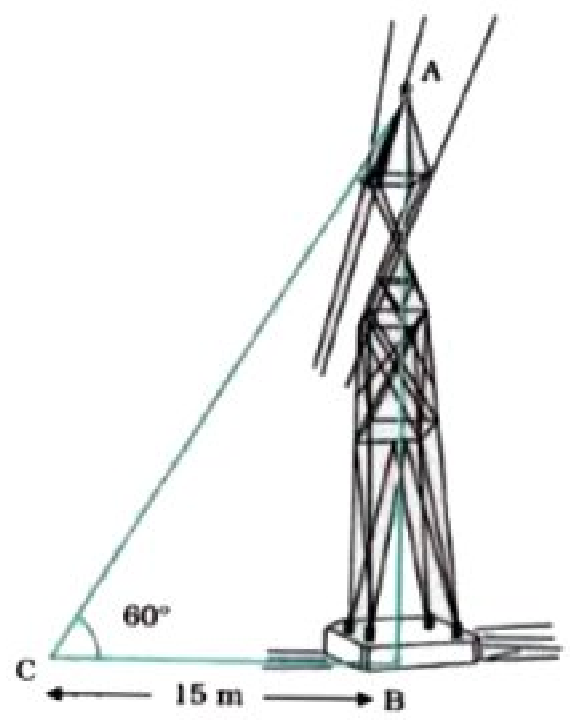
(1)+(2) $\Rightarrow A+B+A-B=60+30=90°$

$$2A=90\Rightarrow \mathbf{A=45°}$$

From (1) $45+B=60\Rightarrow \mathbf{B=15°}$

$\mathrm{A}=45°$ and $\mathrm{B}=15°$

18. AB=height of the tower= h m



CB is the distance of the point from the tower =15m

Angle of elevation $\angle ACB=60°$

From triangle ABC,$tan60°=\frac{AB}{CB}=\frac{AB}{15}$

$$\sqrt{3}=\frac{AB}{15}$$

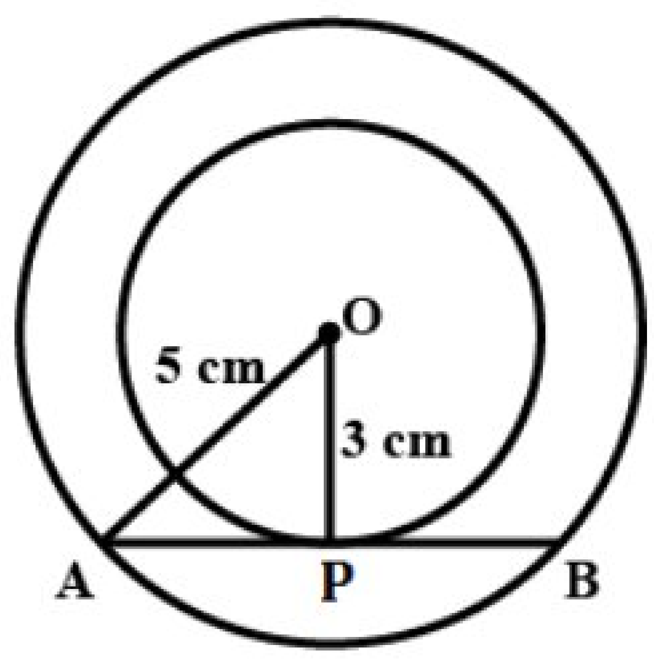
$$AB=15\sqrt{3}\text{m}$$

Hence, the height of the tower is $15\sqrt{3}m$

19.

Let AB be a chord of the larger circle touching the smaller circle at

Then



AP=PB and OP⊥A

Applying Pythagoras theorem in △OPA, we have

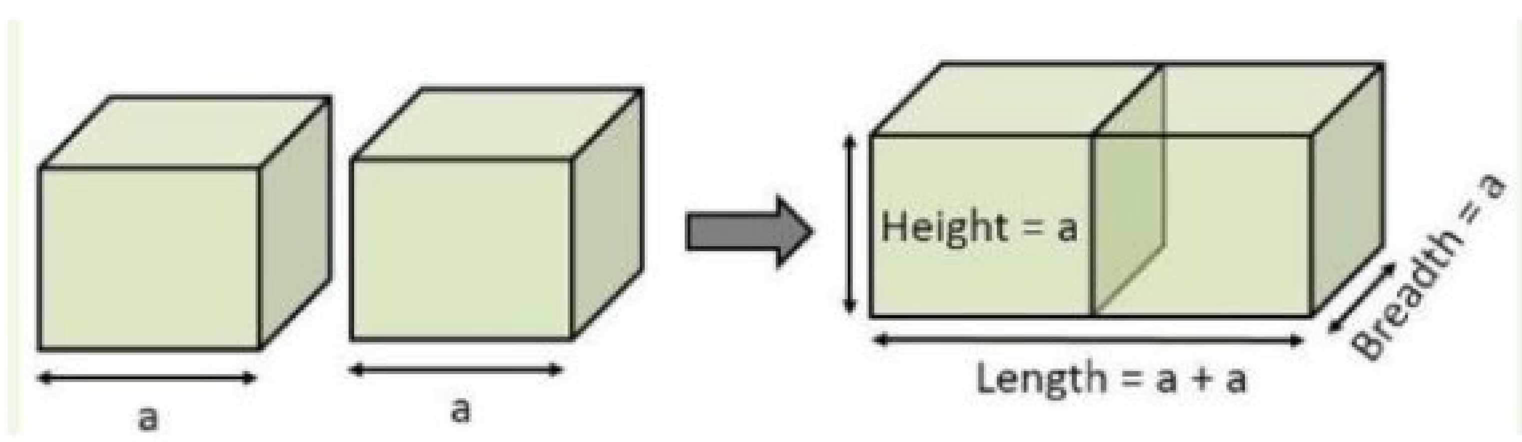
$OA2=OP^2+AP^2$

$\Rightarrow 25=9+AP^2$

$\Rightarrow AP^2=16\Rightarrow AP=4$ cm

$\therefore AB=2AP=8$ cm

20.



The volume of cube $64cm^3$

Side of cube =3√64=4cm

Length of resulting cuboid 4+4=8

Surface area=$2(lh+bh+lb)$

$=2(8(\mathbf{4}) + \mathbf{4}(4) + \mathbf{8}(\mathbf{4}))$2(16+32+32) =2(80) =160cm^2

21.a) Parabola

b) 2

c) -1 and 4

d) -1X4=-4

22.Let x and x + 1 are the two concutive postive integers.

product = 306

$x(x+1) = 306 \Rightarrow x^2 + x - 306 = 0$

$\Rightarrow (x+18)(x-17) = 0$

$\Rightarrow x = -18 \; and \; x = 17$

$\Rightarrow x = -18 \; neglected$

So, x=17

Next consecutive integer=17+1=18

Required positive integers are 17 and 18

23.$given \; S_n = 1050 \; and \; first \; term \; a = 10$

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

$S_{14} = \frac{14}{2}(2(10) + (14-1)d = 1050$

$\Rightarrow 7(20 + 13d) = 1050$

$\Rightarrow 140 + 91d = 1450$

$\Rightarrow 91d = 1050 - 140 = 910$

$\Rightarrow d = \frac{910}{91} = 10$

$a_{20} = a + 19d = 10 + 19(10) = 200$

24. Sol: $LHS \Rightarrow (SinA + Co\sec A)^2 + (CosA + SecA)^2$

$\Rightarrow Sin^2 A + Co\sec^2 A + 2SinA \times Co\sec A + Cos^2 A + Sec^2 A$
$+ 2CosA \times SecA$

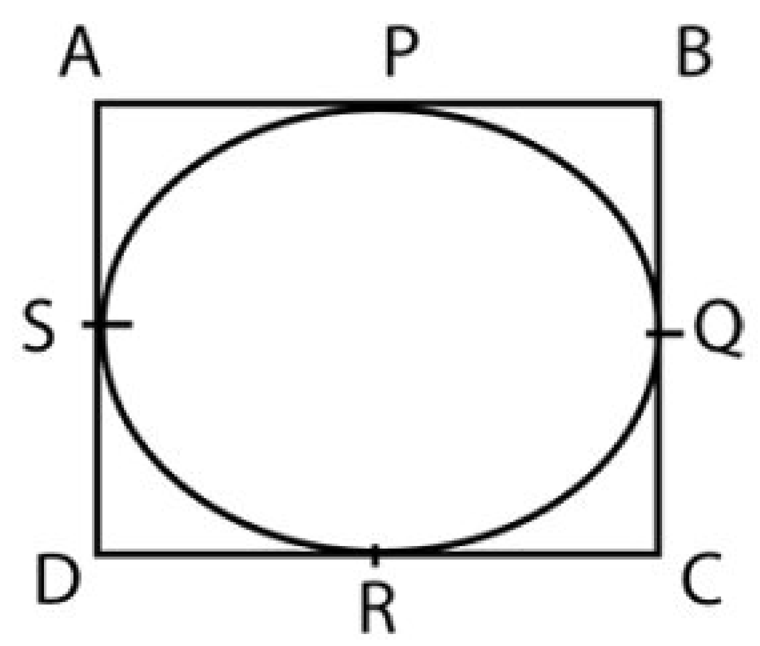
$\Rightarrow (Sin^2 A + Cos^2 A) + 1 + Cot^2 A + 1 + 2 + 1 + Tan^2 A + 2$

$$\left[\begin{array}{l} \Theta\, 1 + Cot^2 A = Co\sec^2 A \\ 1 + Tan^2 A = Sec^2 A \\ Sin^2 A + Cos^2 A = 1 \end{array}\right]$$

$\Rightarrow 1 + 1 + 2 + 1 + 2 + Tan^2 A + Cot^2 A$

$\Rightarrow 7 + Tan^2 A + Cot^2 A$

25.



Since ABCD is a parallelogram circumscribed in a circle

AB=CD........(1)

BC=AD........(2)

We know that tangents drawn from an external point to a circle are equal

DR=DS

CR=CQ

BP=BQ

AP=AS

Adding all these equations we get

DR+CR+BP+AP=DS+CQ+BQ+AS

(DR+CR) +(BP+AP) =(CQ+BQ) + (DS+AS)

CD+AB=AD+BC

Putting the value of equation 1 and 2 in the above equation we get

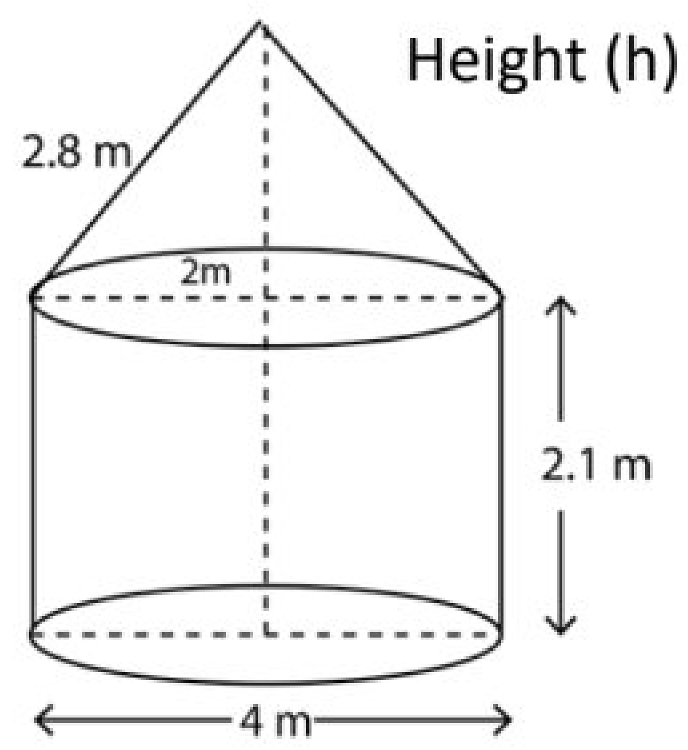
2AB=2BC

AB=BC...........(3)

From equation (1), (2) and (3) we get

AB=BC=CD=DA ∴ABCD is a Rhombus

26. Given:



height (h) of the cylindrical part = 2.1 m

Diameter of the cylindrical part d= 4 m

Radius of the cylindrical part r =d/2 = 2 m

Slant height (l) of conical part = 2.8 m

Area of canvas used = CSA of conical part + CSA of cylindrical part

=πrl+2πrh

=π×2×2.8+2π×2×2.1

=2π [2.8+4.2]

$= \mathbf{2} \times \frac{\mathbf{22}}{\mathbf{7}} \times \mathbf{7}$

=44m^2

27.$Mode = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

f_1 is the frequency of the modal class

f_0 is the frequency of the class preceding the modal class

f_2 is the frequency of the class succeeding the modal class

h is the size of the class intervals

l is the lower limit of the modal class

28. a). $n(S) = 6$

i) Let E be the Event “a prime number”

E= {2,3,5}

$n(E) = 3$

$P(E) = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

ii) Let F be the Event "a number greater than 4"
F= {5,6}

$n(F) = 2$

$$P(F) = \frac{n(F)}{n(S)} = \frac{2}{6} = \frac{1}{3}$$

iii) Let G be the Event "factors of 6"
G= {1,2,3,6}

$n(G) = 4$

$$P(G) = \frac{n(G)}{n(S)} = \frac{4}{6} = \frac{2}{3}$$

iv) Let H be the Event "an even prime"
H= {2}

$n(H) = 1$

$$P(H) = \frac{n(H)}{n(S)} = \frac{1}{6}$$

29a). Letus assume, to the contrary, that $\sqrt{5}$ is rational.

Let us assume that $\sqrt{5}$ is rational. Then $\exists$ p and q are two integers such that that $q \neq 0$ and they are co primes.

$\sqrt{5} = \frac{p}{q} \Rightarrow \sqrt{5}q = p$

$\Rightarrow SBS \Rightarrow 5q^2 = p^2$

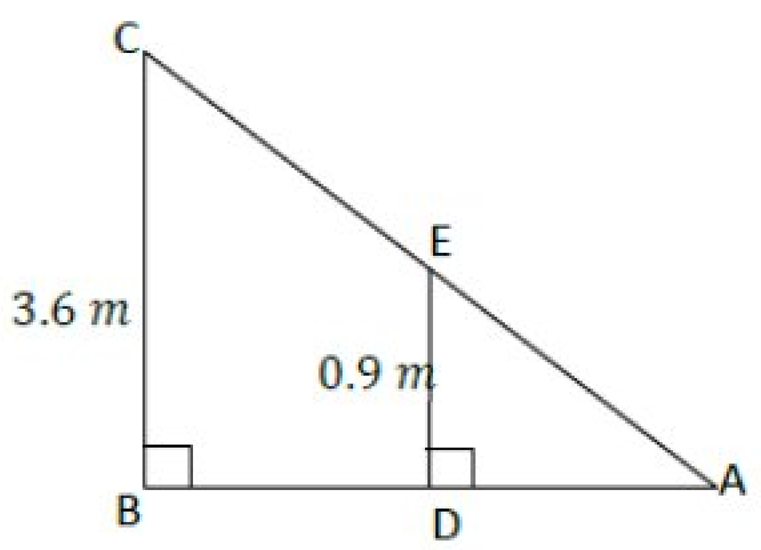
$\Rightarrow 5/p \ (\because 5 \ is \ prime)$

$p = 5k, k \ is \ some \ integer \Rightarrow p^2 = 25k^2 = 5q^2$

$\Rightarrow 5k^2 = q^2 \Rightarrow 5/q \qquad (\because 5 \ is \ prime)$

$\therefore$ 5 divides both p and q. which is contradiction because p and q are co-prime and of our incorrect assumption is rational. Hence $\sqrt{5}$ is irrational.

29 b).



Lamp post (BC)=3.6 m

Height of girl (DE)=90cm=0.9 m

Length of shadow=AD

Distance from pole to girl(BD)=$speed \times time$

$= 1.2 \times 4 = 4.8 \ m$

In ΔADE and ΔABC

$\angle A = \angle A$ (commom)

$\angle D = \angle B = 90^0$

$\Delta ADE \sim \Delta ABC$($AA \ similarity$)

$$\frac{AD}{AB} = \frac{DE}{BC}$$

$$\frac{AD}{AD + BD} = \frac{DE}{BC}$$

$$\frac{AD}{AD + 4.8} = \frac{0.9}{3.6} = \frac{1}{4}$$

$4AD = AD + 4.8$

$3AD = 4.8$

$AD = 1.6$

The length of shadow of girl after 4 seconds=1.6 m

30 a) Solution**:** Let P and Q be the points of trisection of AB i.e., AP=PQ=QB

Section formula = $\left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$

Therefore, P divides AB internally in the ratio 1: 2.
Therefore, the coordinates of P are

$$\left(\frac{1(-7)+2(2)}{1+2}, \frac{1(4)+2(-2)}{1+2}\right) = \left(\frac{-7+4}{3}, \frac{4-4}{3}\right)$$

$$= (-1,0)$$

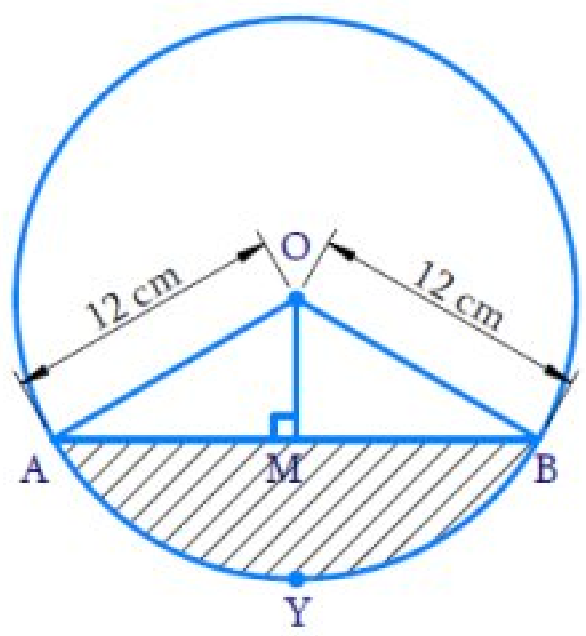
Now, Q also divides AB internally in the ratio 2:1.
So, the coordinates of Q are

$$\left(\frac{2(-7)+1(2)}{2+1}, \frac{2(4)+1(-2)}{2+1}\right) = \left(\frac{-14+2}{3}, \frac{8-2}{3}\right)$$

$$\left(\frac{-12}{3}, \frac{6}{3}\right) = (-4,2)$$

Therefore, the coordinates of the points of trisection of the line segment are P (-1, 0) and Q (-4, 2).

30 b) In the mentioned figure,



O is the centre of circle,
AB is a chord
AYB is the minor arc,
OA=OB= Radius =12 cm
Arc AYB subtends an angle 120º at O.
Area of Sector AOB=$\frac{\mathbf{120}}{\mathbf{360}} \times \boldsymbol{\pi r^2}$
=$\frac{\mathbf{1}}{\mathbf{3}} \times \mathbf{3.14 \times 12 \times 12\ cm^2}$
=150.72 cm²
n ΔAOM and ΔBOM
AO = BO = r (radii of circle)
OM = OM (common side)
∠OMA = ∠OMB = 90° (perpendicular OM drawn)
∴ ΔAOM ≅ ΔBOM (By RHS Congruency)
⇒ ∠AOM = ∠BOM (By CPCT)
Therefore, ∠AOM = ∠BOM = 1/2 ∠AOB = 60°
In ΔAOM,

$$\frac{AM}{OA} = \sin 60° \text{ and } \frac{OM}{OA} = \cos 60°$$

$$\frac{AM}{12} = \frac{\sqrt{3}}{2} \text{ and } \frac{OM}{12} = \frac{1}{2}$$

$$AM = \frac{\sqrt{3}}{2} \times 12 \text{ cm and } OM = \frac{1}{2} \times 12 \text{ cm}$$

$$AM = 6\sqrt{3} \text{ cm and } OM = 6 \text{ cm}$$

⇒ AB = 2 AM
= 2 × 6√3 cm
= 12√3 cm
Area of ΔAOB =$\frac{1}{2} \times AB \times OM$
= $\frac{1}{2} \times 12\sqrt{3}$ cm × 6 cm
= 36 × 1.73 cm²
= 62.28 cm²

Area of the segment (Area of Shaded region) = Area of sector AOB− Area of △AOB
= (150.72−62.28) cm^2
=88.44cm2

31 a). $n(S) = 52$

i) Let E be the Event "a king of red colour"
$n(E) = 2$
$$P(E) = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

ii) Let F be the Event "a face card"
$n(F) = 12$
$$P(F) = \frac{n(F)}{n(S)} = \frac{12}{52} = \frac{3}{13}$$

iii) Let G be the Event "a red face card"
$n(G) = 6$
$$P(G) = \frac{n(G)}{n(S)} = \frac{6}{52} = \frac{3}{26}$$

iv) Let H be the Event "the jack of heart"
$n(H) = 1$
$$P(H) = \frac{n(H)}{n(S)} = \frac{1}{52}$$

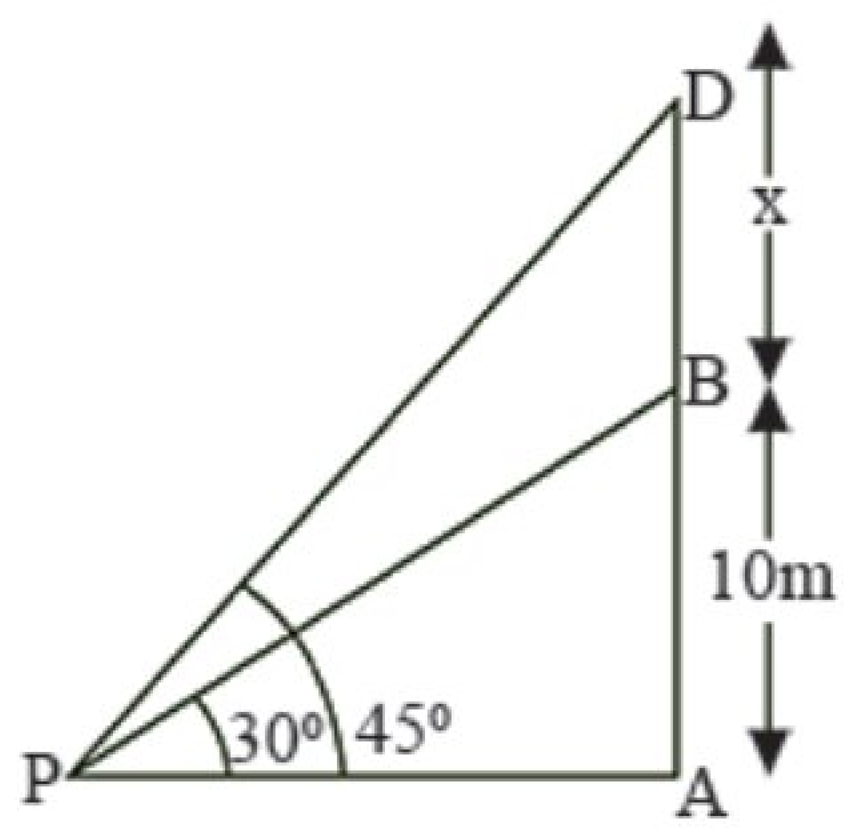
v) Let I be the Event "a spade"
$n(I) = 13$
$$P(I) = \frac{n(I)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

vi) Let J be the Event "a queen of diamonds"
$n(J) = 1$
$$P(J) = \frac{n(J)}{n(S)} = \frac{1}{52}$$

vii) Let K be the Event "an ace of black colour"
$n(K) = 2$
$$P(K) = \frac{n(K)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

viii) Let L be the Event "not a face card"
$n(L) = 40$
$$P(L) = \frac{n(L)}{n(S)} = \frac{40}{52} = \frac{10}{13}$$

31b)



In figure AB denotes the height of the building=10m
BD the flagstaff and P the given point.
Note that there are two right triangles PAB and PAD.
We are required to find the length of the flagstaff i.e., BD and the distance of the building from the point P i.e., PA.
Since, we know the height of the building AB, we will first consider the right △PAB
⇒ Let x be the height of the flag-staff
In right angled △PAB,

⇒ Now, $\tan 30^\circ = \frac{AB}{PA}$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{10}{PA}$$

∴ PA=10√3m= (10×1.732) m=17.32m

In right angled △CBP,

$\Rightarrow \tan 45^o = \frac{AD}{PA}$

$\Rightarrow \mathbf{1} = \frac{\mathbf{10}+\boldsymbol{x}}{\boldsymbol{PA}} = \frac{\mathbf{10}+\boldsymbol{x}}{\mathbf{17.32}}$

⇒ 17.32=10+ $\boldsymbol{x}$

∴ x=7.32m

∴ The length of flagstaff is 7.32m and the distance of the building from the point P is 17.32m.

32a)

Daily pocket allowance C.I	Number of children f	c.f
11-13	7	7
13-15	6	13
15-17	9	22 c.f
17-19	**13 f**	**35**
19-21	20	55
21-23	5	60
23-25	4	64
	$n = 64$	

$\frac{n}{2} = \frac{64}{2} = 32$

Median class 17-19

f=13, c.f =22, l=17, h=2

$$Median = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$$

$$= 17 + \left(\frac{32-22}{13}\right) \times 2 = 17 + \frac{20}{13}$$

$$= 17 + 1.54 = 18.54\ (approx)$$

∴ Median daily pocket allowance Rs.18.54

32b) $Given\ S_n = 4n - n^2$

$$S_1 = a_1 = 4(1) - 1^2 = 4 - 1 = 3$$

$$S_2 = 4(2) - 2^2 = 8 - 4 = 4$$

$$a_2 = S_2 - S_1 = 4 - 3 = 1$$

$$d = a_2 - a_1 = 1 - 3 = -2$$

$$a_3 = a + 2d = 3 + 2(-2) = 3 - 4 = -1$$

$$a_{10} = a + 9d = 3 + 9(-2) = 3 - 18 = -15$$

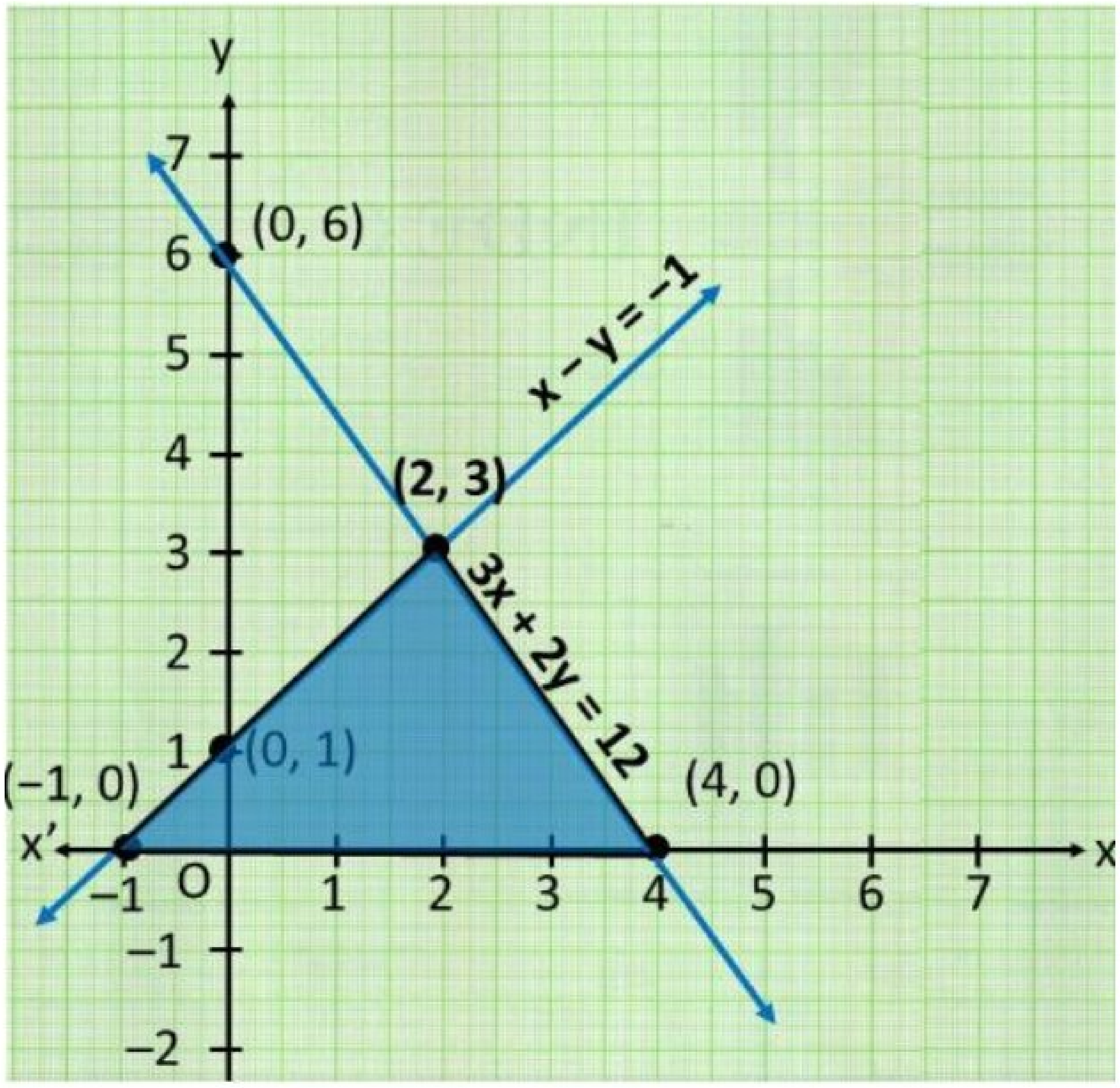
$$a_n = a + (n-1)d = 3 + (n-1)(-2) = 3 - 2n + 2 = 5 - 2n$$

33a) Table for solutions of $x - y = -1$

x	0	-1
y	1	0
(x, y)	(0,1)	(-1,0)

Table for solutions of $3x + 2y = 12$

x	0	4
y	6	0
(x, y)	(0,6)	(-1,0)



33 b.Let cost one pencil =Rs. X

Cost of one pen=Rs. y

Case 1: cost of 5 pencils and 7 pens together cost Rs.50

5x+7y=50

Case 2: cost of 7 pencils and 5 pens together cost Rs.46

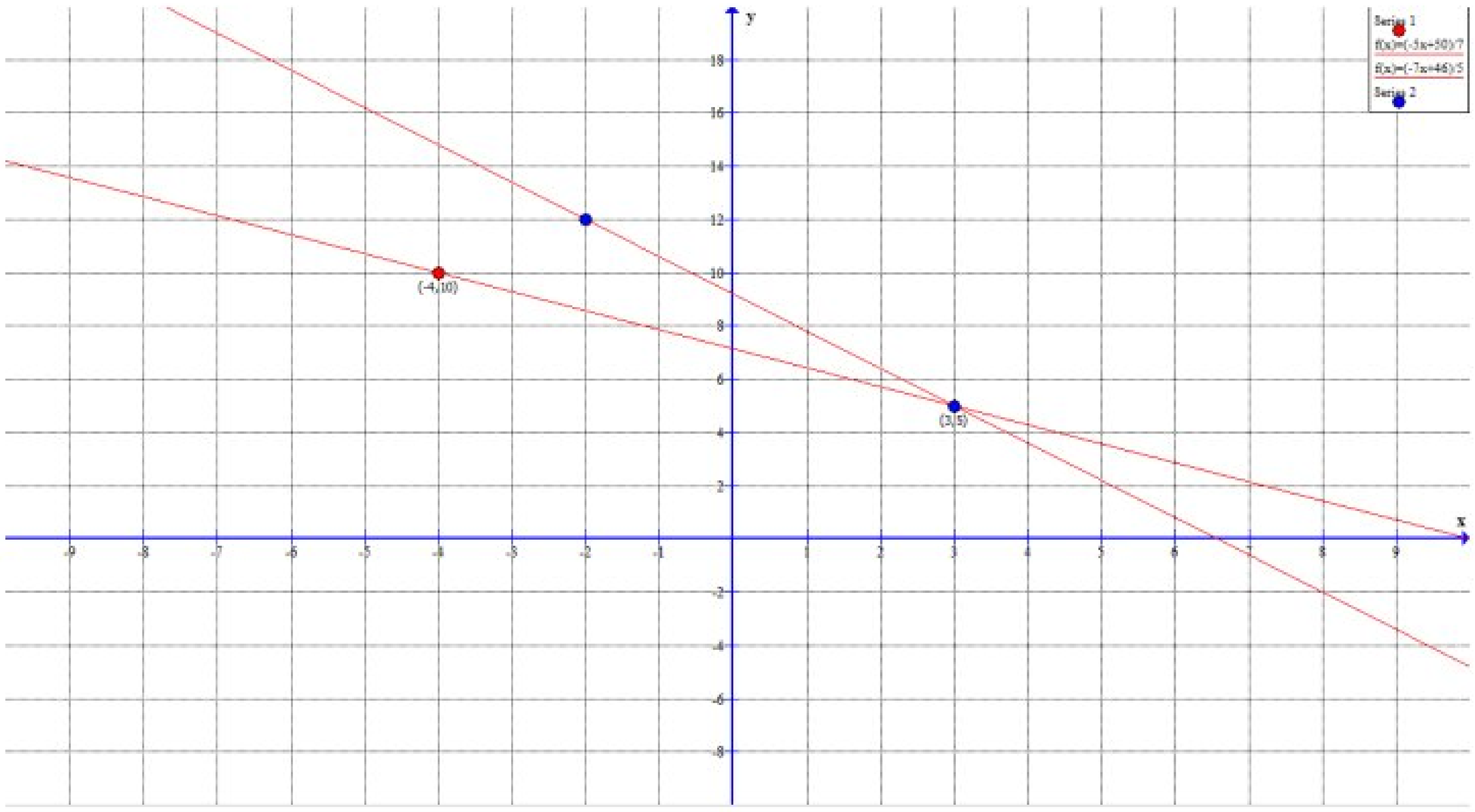
7x+5y=46

Table for solutions of $5x + 7y = 50$

x	3	-4
y	5	10
(x, y)	(3,5)	(-2,12)

Table for solutions of $7x + 5y = 46$

x	3	-2
y	5	12
(x, y)	(3,5)	(-2,12)



Cost of one pencil =Rs.3

Cost of one pen=Rs.5