SOLUTIONS

1. (*b*) $a = x \times x \times x \times y \times y$ and $b = xy \times y \times y$

$\therefore$ HCF $(a, b) = x \times y \times y = x \times y^2 = xy^2$

2. (*c*), Let α and β be the roots of the equation

$x^2 + px + 1 - p = 0$

Let $\alpha = 1 - p$ (given)

$\therefore \quad \alpha + \beta = \frac{-p}{1}$

$1 - p + \beta = -p$

$\Rightarrow \quad \beta = -1$

Putting $\beta = -1$ in $x^2 + px + 1 - p = 0$, we get

$\therefore \quad \alpha = 1 - 1 = 0$

Roots of equation are 0 and – 1

3. (*c*), We have $\quad p(x) = ax^2 + bx + c$

Putting $x = -1$, we get

$p(-1) = a - b + c = (a + c) - b = b - b = 0$

(As $a + c = b$)

$\therefore$ – 1 is zero of $p(x)$

Let other zero be β.

$\therefore \quad (-1)\beta = \frac{c}{a}$ (Product of roots)

$\beta = -\frac{c}{a}$

4. (*c*)

$2472 = 2^3 \times 3 \times 103$

$1284 = 2^2 \times 3 \times 107$

$\because \quad \text{LCM} = 2^3 \times 3^2 \times 5 \times 103 \times 107$

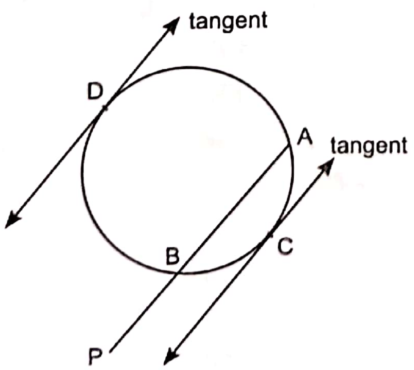
$\therefore \quad N = 2^2 \times 3^2 \times 5 = 180$

5. (*c*) $(3 - 0)^2 + (\sqrt{3} - 0)^2 = (3 - 0)^2 + (k - 0)^2$

$\Rightarrow \quad 3 = k^2 \Rightarrow k = \pm\sqrt{3}$

$\Rightarrow \quad k = -\sqrt{3}$

6. (*b*), Here PBA is a secant. We can draw only two tangents which are parallel to secant PBA



7. (*c*), (cosec A – sin A)(sec A – cos A)(tan A + cot A)

$= \left(\frac{1}{\sin A} - \sin A\right)\left(\frac{1}{\cos A} - \cos A\right)\left(\frac{\sin A}{\cos A} + \frac{\cos A}{\sin A}\right)$

$= \frac{\cos^2 A}{\sin A} \cdot \frac{\sin^2 A}{\cos A} \cdot \frac{1}{\sin A \cdot \cos A} = \frac{\cos^2 A \sin^2 A}{\sin^2 A \cos^2 A} = 1$

8. (*d*), $\sqrt{3}\sin\theta - \cos\theta = 0$

$\sqrt{3}\sin\theta = \cos\theta$

$\tan\theta = \sqrt{3}$

$\tan\theta = \tan 60° \Rightarrow \theta = 60°$

9. (*c*) $\because \quad \frac{BF}{FC} = \frac{AE}{EC}$

$\therefore \quad EF \parallel AB.$

10. (*c*) $\because \Delta ABC \sim \Delta EDF$

Then, $\quad \frac{AB}{ED} = \frac{BC}{DF} = \frac{AC}{EF}$

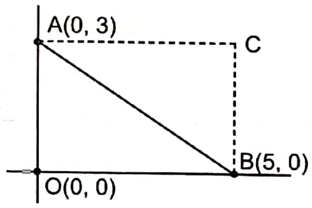
$\Rightarrow \quad AB.DF = ED.BC$

or $\quad AB.EF = AC.ED$

or $\quad BC.EF = DF.AC$

$\therefore \quad BC.DE \neq AB.EF$

11. (*c*)



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

$= \sqrt{25 + 9} = \sqrt{34}$ units

12. (*b*), Let three terms in AP are $a + d$, a, $a - d$

$\therefore a + d + a + a - d = 24 \Rightarrow a = 8$

$\therefore$ Middle term $= a = 8$

13. (*a*), Here, $a = 22$, $d = 19 - 22 = -3$

Let a_n be its first negative term.

$\Rightarrow \quad a_n < 0$

$\Rightarrow \quad a + (n - 1)d < 0$

$\Rightarrow 22 + (n - 1)(-3) < 0$

$\Rightarrow \quad 22 - 3n + 3 < 0$

$\Rightarrow \quad -3n < -25$

$\Rightarrow \quad 3n > 25$

$\Rightarrow \quad n > \frac{25}{3}$

$\therefore$ 9th term is the first negative term of the given AP.

14. (*d*)

15. (*a*), Let the side of a solid cube be x units

Volume of a solid cube = x^3 cubic units

This solid cube is cut into 27 small cubes of equal volume.

Volume of one small cube $=\frac{1}{27}x^3$ cubic units

$\Rightarrow$ Side of one small cube $=\frac{1}{3}x$ units.

Now, surface area of a solid cube $= 6 \times x^2$ sq units

Surface area of one small cube $= 6 \times \frac{1}{9}x^2$ sq units

$$\therefore \frac{\text{Surface area of a solid cube}}{\text{Surface area of one small cube}} = \frac{6x^2}{6 \times \frac{1}{9}x^2} = \frac{9}{1}$$

$\Rightarrow$ Required ratio = 9 : 1

16. (*c*)

17. (*d*) $\because$ $P(E) + P(\bar{E}) = 1$

$\therefore$ $q = 1$

18. (*a*) $\because$ $\sin\theta$ and $\cos\theta$ are the roots,

$$\sin\theta + \cos\theta = -\left(\frac{-b}{a}\right)$$

and $\sin\theta \,.\, \cos\theta = \frac{c}{a}$

$$\Rightarrow (\sin\theta + \cos\theta)^2 = \left(\frac{b}{a}\right)^2$$

$$\Rightarrow \sin^2\theta + \cos^2\theta + 2\sin\theta \,.\, \cos\theta = \frac{b^2}{a^2}$$

$$\Rightarrow 1 + 2\left(\frac{c}{a}\right) = \frac{b^2}{a^2}$$

$\Rightarrow a^2 + 2ac = b^2 \Rightarrow b^2 - a^2 = 2ac$

19. (*c*)

20. (*b*) is correct option.

21. Let the present age of Aftab be x years and the present age of his daughter be y years.

According to question,

$x - 7 = 7(y - 7)$

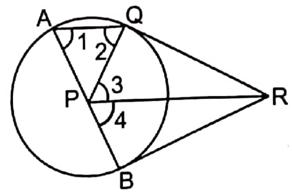
$\Rightarrow$ $x - 7y = -42$ ...(*i*)

and $x + 3 = 3(y + 3)$

$\Rightarrow$ $x - 3y = 6$ ...(*ii*)

Thus, the algebraic representation is given by (*i*) and (*ii*).

22. Given: QR is tangent at Q to a circle having centre at P and chord AQ || PR



To prove: BR is tangent at B.

Proof: We have AQ || PR

$\therefore$ $\angle 1 = \angle 4$ (Corresponding angles) ...(*i*)

and $\angle 2 = \angle 3$ (Alternate interior angles) ...(*ii*)

Also, $\angle 1 = \angle 2$

($\because$ PA = PQ, radii of the same circle)... (*iii*)

From (*i*), (*ii*) and (*iii*), we get

$\angle 3 = \angle 4$ ...(*iv*)

In ΔPQR and ΔPBR,

PR = PR (Common)

PQ = PB (Radii of the same circle)

$\angle 3 = \angle 4$ (From (*iv*)

$\therefore$ $\Delta PQR \cong \Delta PBR$ (SAS congruence rule)

$\Rightarrow$ $\angle PBR = \angle PQR$ (CPCT)

Now, $\angle PQR = 90°$ [QR is tangent and PQ is radius]

$\therefore$ $\angle PBR = 90°$

$\Rightarrow$ BR is tangent at B. Hence proved.

23. Given: ABCDEF hexagon circumscribe a circle and touches at G, H, I, J, K, L.

To prove: AB + CD + EF = BC + DE + FA

Proof: Hexagon ABCDEF touches a circle at G, H, I, J, K, L. So, from the external point, tangents drawn on the circle are equal in length.

If A is external point and AG and AL are tangents, so

AG = AL ...(*i*)

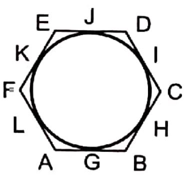
Similarly for B, BG = BH ...(*ii*)

Similarly for C, CI = CH ...(*iii*)

Similarly for D, DI = DJ ...(*iv*)

Similarly for E, EK = EJ ...(*v*)

and similarly for F, FK = FL ...(*vi*)



Adding (*i*), (*ii*), (*iii*), (*iv*), (*v*) and (*vi*), we get

AG + BG + CI + DI + EK + FK

= AL + BH + CH + DJ + EJ + FL

$\Rightarrow$ (AG + BG) + (CI + DI) + (EK + FK)

= (BH + CH) + (JD + EJ) + (FL + AL)

$\Rightarrow$ AB + CD + EF = BC + DE + FA. Hence proved.

24. Let the Ist term of AP be a and the common difference be d

A.T.Q. $a_5 = 0$

$\Rightarrow \quad a + 4d = 0 \Rightarrow a = -4d \quad ...(i)$

Now, $a_{33} = a + 32d$

$\Rightarrow \quad a_{33} = -4d + 32d \quad$ [(using (i)]

$\Rightarrow \quad a_{33} = 28d \quad ...(ii)$

Also, $a_{19} = a + 18d$

$\Rightarrow \quad a_{19} = -4d + 18d \quad$ ...[using (i)]

$\Rightarrow \quad a_{19} = 14d$

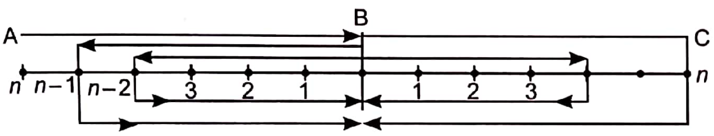
On multiplying with 2 on both the sides, we get

$\Rightarrow \quad 2 \times a_{19} = 2 \times 14d = 28d \quad ...(iii)$

From (ii) and (iii)

$a_{33} = 2 \times a_{19}$ Hence proved.

OR



Let there are $(2n + 1)$ stones. The middle stone is at B. Let n stones are on one side of B and n stones on other side of B.

Let man started from A.

Distance covered from A to B $= 10 \times n$ m $= 10n$ metres

Distance covered to carry IInd stone

$= 2 \times (n - 1) \times 10$ metres

Distance covered to carry IIIrd stone

$= 2 \times (n - 2) \times 10$ metres

and so on.

$\therefore$ Total distance covered to carry n stones from this side of B

$= 10n + 2 \times (n - 1) \times 10 + 2 \times (n - 2) \times 10 + \ldots\ldots + 2 \times 10$

$= 10[n + 2(n - 1) + 2(n - 2) + \ldots + 2]$

$= 10\{n + 2[(n - 1) + (n - 2) + \ldots + 1]\}$

$= 10\left\{n + 2 \times \frac{n-1}{2} \times [(n-1)+1]\right\}$

$= 10[n + (n - 1)n] = 10[n + n^2 - n] = 10n^2$

Now, distance covered to collect n stones from other side of B will be $10n$ metres more than this distance as the person has to move from B to C to pick the stone at other end and come back.

$\therefore$ Distance covered to collect n stones from other side $= 10n^2 + 10n$

Total distance covered

$= 10n^2 + 10n^2 + 10n = 20n^2 + 10n$

According to question,

$$20n^2 + 10n = 3000$$

$\Rightarrow \quad 2n^2 + n - 300 = 0$

$\Rightarrow \quad 2n^2 + 25n - 24n - 300 = 0$

$\Rightarrow \quad n(2n + 25) - 12(2n + 25) = 0$

$\Rightarrow \quad (n - 12)(2n + 25) = 0$

$\Rightarrow \quad n - 12 = 0$ or $2n + 25 = 0$

$\Rightarrow \quad n = 12$ or $n = \frac{-25}{2}$ (rejecting)

$\therefore$ Total number of stones $= 2n + 1 = 2 \times 12 + 1 = 25$

25. We have $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$

Consider LHS $= (m^2 + n^2)\cos^2\beta$

$$= \left(\frac{\cos^2\alpha}{\cos^2\beta} + \frac{\cos^2\alpha}{\sin^2\beta}\right)\cos^2\beta$$

$$= \left(\frac{\cos^2\alpha\sin^2\beta + \cos^2\alpha\cos^2\beta}{\cos^2\beta\sin^2\beta}\right)\cos^2\beta$$

$$= \frac{\cos^2\alpha(\sin^2\beta + \cos^2\beta)}{\sin^2\beta}$$

$$= \frac{\cos^2\alpha}{\sin^2\beta} = \left(\frac{\cos\alpha}{\sin\beta}\right)^2 = n^2 = \text{RHS}$$

$\therefore$ LHS = RHS. Hence proved.

OR

$$\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3$$

$\Rightarrow \quad \dfrac{\cos^2\theta}{\dfrac{\cos^2\theta}{\sin^2\theta} - \cos^2\theta} = 3 \Rightarrow \dfrac{\cos^2\theta\sin^2\theta}{\cos^2\theta(1 - \sin^2\theta)} = 3$

$\Rightarrow \quad \dfrac{\sin^2\theta}{\cos^2\theta} = 3 \Rightarrow \tan^2\theta = 3$

$\Rightarrow \quad \tan\theta = \sqrt{3} = \tan 60° \Rightarrow \theta = 60°$

26. Let us suppose that $3 - 2\sqrt{5}$ is rational.

$\therefore$ $3 - 2\sqrt{5}$ can be written in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

$\Rightarrow \quad 3 - 2\sqrt{5} = \frac{p}{q} \quad \Rightarrow \quad 3 - \frac{p}{q} = 2\sqrt{5}$

$$\Rightarrow \quad \frac{3q-p}{q} = 2\sqrt{5} \quad \Rightarrow \quad \frac{3q-p}{2q} = \sqrt{5}$$

Since p and q are integers, we get $\frac{3q-p}{2q}$ is rational, and so $\sqrt{5}$ is rational.

But this contradicts the fact that $\sqrt{5}$ is irrational.

$$\therefore \quad \frac{3q-p}{2q} \neq \sqrt{5}$$

So, our supposition is wrong.

Hence, $3 - 2\sqrt{5}$ is irrational.

27. $$\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0$$

$$\Rightarrow \quad \frac{2x(2x+3) + x - 3 + 3x + 9}{(x-3)(2x+3)} = 0$$

$$\Rightarrow \quad 4x^2 + 10x + 6 = 0$$

$$\Rightarrow \quad 2x^2 + 5x + 3 = 0$$

$$\Rightarrow \quad (x+1)(2x+3) = 0$$

$$\Rightarrow \quad x = -1 \text{ or } x = \frac{-3}{2}$$

When $x = \frac{-3}{2}$, given equation is not defined.

$$\therefore \quad x = -1$$

28. Let total number of pottery articles produced in a particular day be x.

Cost of production per article = ₹$\frac{90}{x}$

ATQ $$2x + 3 = \frac{90}{x}$$

$$\Rightarrow \quad x(2x+3) = 90$$

$$\Rightarrow \quad 2x^2 + 3x = 90$$

$$\Rightarrow \quad 2x^2 + 3x - 90 = 0$$

$$\Rightarrow \quad (2x+15)(x-6) = 0$$

$$\Rightarrow \quad 2x = -15 \text{ or } x - 6 = 0$$

$$\Rightarrow \quad x = -\frac{15}{2} \text{ (rejected) or } x = 6$$

$\therefore$ Number of articles produced in a particular day = 6

Cost of production per article = $\frac{90}{6}$ = ₹ 15

OR

Given; $a_{11} = 38$ and $a_{16} = 73$

$$\Rightarrow \quad a + 10d = 38 \text{ and } a + 15d = 73$$

$$\Rightarrow \quad a + 15d - a - 10d = 73 - 38$$

$$\Rightarrow \quad 5d = 35$$

$$\Rightarrow \quad d = 7$$

$$\therefore \quad a_{11} = a + 10 \times 7 = 38$$

$$\Rightarrow \quad a = 38 - 70 = -32$$

$$\therefore \quad a_{31} = a + 30d = -32 + 30 \times 7$$

$$= -32 + 210 = 178$$

29. Given $\sec\theta = x + \frac{1}{4x}$.

Squaring both sides, we get

$$\sec^2\theta = \left(x + \frac{1}{4x}\right)^2$$

$$\Rightarrow \quad \sec^2\theta = x^2 + \frac{1}{16x^2} + \frac{1}{2}$$

$$\Rightarrow \quad \tan^2\theta = x^2 + \frac{1}{16x^2} - \frac{1}{2} = \left(x - \frac{1}{4x}\right)^2$$

$$\Rightarrow \quad \tan\theta = \left(x - \frac{1}{4x}\right) \text{ or } -\left(x - \frac{1}{4x}\right)$$

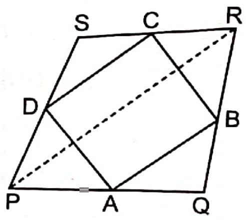
Consider LHS = $\sec\theta - \tan\theta$

$$= x + \frac{1}{4x} - x + \frac{1}{4x}$$

or $$x + \frac{1}{4x} + \left(x - \frac{1}{4x}\right) = \frac{1}{2x} \text{ or } 2x = \text{RHS}$$

$\therefore$ LHS = RHS Hence proved

30. **Given:** In a quadrilateral PQRS, A, B, C and D are the mid-points of sides PQ, QR, RS and SP respectively.



To prove: ABCD is a parallelogram.

Construction: Join PR.

Proof: In ΔPQR, A and B are mid-points of sides PQ and QR respectively

$\therefore$ AB || PR (Using mid-point theorem) ...(*i*)

In ΔPSR, D and C are mid-points of sides PS and SR respectively.

$\therefore$ DC || PR (Using mid-point theorem) ...(*ii*)

From (*i*) and (*ii*), we get

AB || DC

Similarly, we have AD || BC

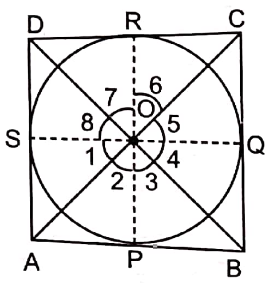
∴ In quadrilateral ABCD, AB || CD and AD || BC

∴ ABCD is a parallelogram, because both pairs of opposite sides of a quadrilateral ABCD are parallel.

OR

AB touches at P and BC, CD and DA touch the circle at Q, R and S.

Construction: Join OA, OB, OC, OD and OP, OQ, OR, OS



$\therefore \qquad \angle 1 = \angle 2$ [OA bisects $\angle$POS]

Similarly $\qquad \angle 4 = \angle 3;$

$\angle 5 = \angle 6;$

$\angle 8 = \angle 7$

$$2[\angle 1 + \angle 4 + \angle 5 + \angle 8] = 360°$$

$$(\angle 1 + \angle 8 + \angle 4 + \angle 5) = 180°$$

$$\angle AOD + \angle BOC = 180°$$

Similarly $\qquad \angle AOB + \angle COD = 180°$

Hence, opposite sides of quadrilateral circumscribing a circle subtend supplementary angles at the centre of a circle.

31. Total number of objects = 12 + 8 + 10 = 30

Number of blue triangles = 6

Number of green triangles = 8 – 6 = 2

Number of green rectangles = 3

Number of blue rectangles = 12 – 3 = 9

Number of blue rhombuses = 3

Number of green rhombuses = 10 – 3 = 7

(*i*) Probability that one piece lost is a rectangle

$= \frac{12}{30} = \frac{2}{5}$

(*ii*) Probability that one piece lost is a triangle of green colour $= \frac{2}{30} = \frac{1}{15}$

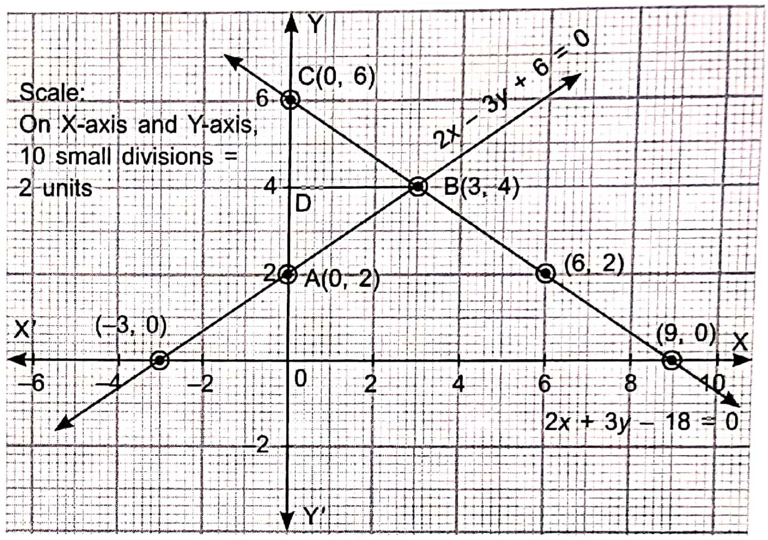
(*iii*) Probability that one piece lost is a rhombus of blue colour $= \frac{3}{30} = \frac{1}{10}$

32. The solution table for $2x - 3y + 6 = 0$ is:

x	0	–3	3
y	2	0	4

The solution table for $2x + 3y - 18 = 0$ is:

x	0	9	6
y	6	0	2



Coordinates of the vertices of a triangle are A(0, 2), B(3, 4) and C(0, 6)

$\therefore$ Area of $\Delta ABC = \frac{1}{2}$ base × height

$= \frac{1}{2} \times AC \times BD = \frac{1}{2} \times 4 \times 3 = 6$ sq units

OR

Let the digit at unit's place be x and the digit at ten's place be y

$\therefore \qquad$ Required number $= 10y + x$

When the digits are reversed, the number becomes $10x + y$

According to the question,

$$8(10y + x) = 3(10x + y)$$

$\Rightarrow \qquad 80y + 8x = 30x + 3y$

$\Rightarrow \qquad 77y - 22x = 0 \Rightarrow 7y - 2x = 0 \qquad ...(i)$

Also, $\qquad x - y = 5$ (keeping $x > y$) $\qquad ...(ii)$

Multiplying (*ii*) by 2 and adding to (*i*), we get

$$y = 2$$

Putting $y = 2$ in (*ii*), we get

$$x - 2 = 5$$

$\Rightarrow \qquad x = 7$

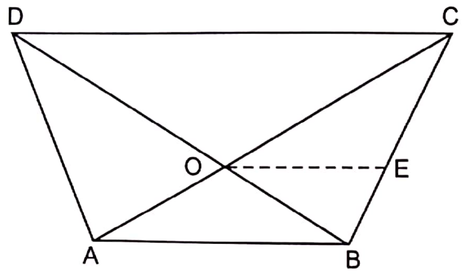
$\therefore$ Required number $10y + x = 10 \times 2 + 7 = 27$

33. Given: A quadrilateral ABCD, whose diagonals intersect at O.

and $\frac{AO}{BO} = \frac{CO}{DO}$ or $\frac{AO}{OC} = \frac{BO}{DO}$

To Prove: ABCD is a trapezium.

Construction: Draw EO || AB



Proof: In ΔABC, OE || AB

$\therefore \quad \frac{AO}{OC} = \frac{BE}{EC}$ [By B.P.T.] ...(*i*)

But given that $\frac{AO}{OC} = \frac{BO}{DO}$ ...(*ii*)

From equation (*i*) and (*ii*)

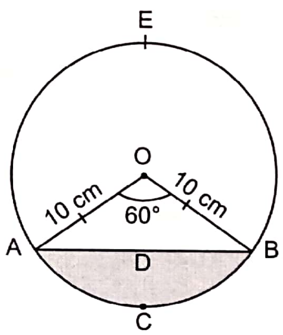
$$\frac{BO}{DO} = \frac{BE}{EC}$$

$\Rightarrow$ OE || DC [By converse of B.P.T.]

OE || AB and OE || DC $\Rightarrow$ AB || DC

$\therefore$ ABCD is a trapezium.

34.



Radius of the circle = 10 cm

Central angle subtended by chord AB = 60°

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

$$= \frac{22}{7} \times \frac{(10)^2 \times 60°}{360°}$$

$$= \frac{22}{7} \times \frac{10 \times 10}{6}$$

$$= \frac{1100}{21} \text{ cm}^2$$

$$= 52.38 \text{ cm}^2$$

Area of equilateral triangle OAB formed by radii and chord

$$= \frac{\sqrt{3}}{4} a^2$$

$$= \frac{\sqrt{3}}{4} \times (10)^2$$

$$= \frac{1.732}{4} \times 100$$

$$= 43.3 \text{ cm}^2$$

$\therefore$ Area of minor segment ACBD

= Area of sector OACB – Area of triangle OAB

$= (52.38 - 43.30) \text{ cm}^2$

$= 9.08 \text{ cm}^2$

Area of circle $= \pi r^2$

$$= \frac{22}{7} \times (10)^2$$

$$= \frac{22 \times 100}{7} \text{ cm}^2$$

$$= 314.28 \text{ cm}^2$$

$\therefore$ Area of major segment ADBE

= Area circle – Area of minor segment

$= (314.28 - 9.08) \text{ cm}^2$

$= 305.20 \text{ cm}^2$

OR

Radius of the circle = 45 cm

Number of ribs = 8

Angle between two consecutive ribs

$$= \frac{\text{central angle of the circle}}{\text{number of the sectors (ribs)}}$$

$$= \frac{360°}{8}$$

$$= 45°$$

Area between two consecutive ribs = Area of one sector of circle

$$= \frac{\pi r^2 \theta}{360°}$$

$$= \frac{22}{7} \times \frac{45° \times 45° \times 45°}{360°}$$

$$= \frac{11 \times 45 \times 9 \times 5}{7 \times 4} \text{ cm}^2$$

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

35.

Classes	Frequency	Cumulative frequency
0 – 20	6	6
20 – 40	8	14
40 – 60	10	24
60 – 80	12	36
80 – 100	6	42
100 – 120	5	47
120 – 140	3	50
	$n = 50$	

← Median Class

$\therefore \quad \frac{n}{2} = 25$

Median class = (60 – 80)

$l = 60, f = 12, c.f. = 24, h = 20.$

$$\text{Median} = l + \frac{\frac{n}{2} - c.f.}{f} \times h$$

$$= 60 + \frac{25-24}{12} \times 20$$

$$= 60 + \frac{1 \times 5}{3} = \frac{180+5}{3} = \frac{185}{3}$$

$$= 61.6$$

Modal class = (60 – 80) as its frequency is 12

$h = 20, l = 60, f_1 = 12, f_0 = 10, f_2 = 6.$

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

$$= 60 + \frac{12-10}{2 \times 12 - 10 - 6} \times 20$$

$$= 60 + \frac{2}{8} \times 20 = 65$$

Now, Mode = 3 Median – 2 Mean

65 = 3 (61.6) – 2 Mean

2 Mean = 184.8 – 65

2 Mean = 119.8

$\Rightarrow \quad \text{Mean} = \frac{119.8}{2} = 59.9$

$\therefore$ Mean = 59.9; Median = 61.6; Mode = 65

36. (*i*) $\sqrt{8}$ units (*ii*) $4\sqrt{2}$ units (*iii*) 1 : 2 **OR** 1 : 1

37. (*i*) Diameter of base of heap = 24 m

Radius of base of heap = $\frac{24}{2}$ m = 12 m

Height of heap = 3.5 m

Let l be the slant height of heap

$$\therefore \quad l = \sqrt{r^2 + h^2}$$

$$= \sqrt{(12)^2 + (3.5)^2}$$

$$= \sqrt{144 + 12.25} = \sqrt{156.25}$$

$$l = \sqrt{156.25} = 12.5 \text{ m}$$

(*ii*) Canvas cloth required to cover the heap = $\pi r l$

$$= \frac{22}{7} \times 12 \times 12.5 = 471.42 \text{ m}^2$$

(*iii*) Volume of heap of wheat

$$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 12 \times 12 \times 3.5$$

$$= 22 \times 4 \times 12 \times 0.5 = 528 \text{ m}^3$$

OR

Volume of one bag = 0.48 m^3

Number of bags required = $\frac{528}{0.48}$ = 1100

38. (*i*) $\angle ACD = \angle CAX$ (Alternate angles)

$\therefore \quad \angle ACD = 45°$

(*ii*) In right-angled ΔADC,

$$\tan 45° = \frac{AD}{CD} \Rightarrow CD = AD = 100 \text{ m}$$

(*iii*) In right-angled ΔADB,

$$\tan 30° = \frac{AD}{DB} \quad \{\because \angle ABD = \angle BAY\}$$

$$\Rightarrow \quad BD = AD \cot 30° = 100 \times \sqrt{3} \text{ m}$$

OR

In ΔADC,

$$\sin 45° = \frac{AD}{AC} \Rightarrow AC = AD \times \sqrt{2} = 100\sqrt{2} \text{ m}$$

$$\left\{\sin 45° = \frac{1}{\sqrt{2}}\right\}$$