THIRE REVISION MARCH 2025

10TH MATHS KEY ANSWER (CHENNAI)

I CHOOSE THE CORRECT ANSWER

1. c 12
2. d quadratic
3. a 1
4. b $\frac{1}{27}$
5. a straight line
6. c $-1, 2$
7. b point of contact
8. d $5\sqrt{2}$cm
9. c (3, 5)
10. b $\frac{3}{2}$
11. a 12cm
12. c 3π
13. a 0
14. c 33.25

II ANSWER ANY 10 ONLY

15. Given $R = \{ (x,y)/ y = x + 3, x\in \{0,1,2,3,4,5 \}\}$

$\therefore$ Relation =

$\{ (0,3), (1,4), (2,5), (3,5), (4,7), (5,8)\}$

Domain $= \{ 0, 1, 2, 3, 4, 5 \}$ **and**

Range $= \{ 3, 4, 5, 6, 7, 8 \}$

16. $fof(k) = (2k - 1)o(2k - 1) = 2(2k - 1) - 1$

Thus $fof(k) = 4k - 3$

But, it is given that $fof(k) = 5$

Therefore $4k - 3 = 5$

$4k = 8 \Rightarrow$ **K = 2**

17. $1 + 2 + 3 + \ldots\ldots + k = 325$

$1^3 + 2^3 + 3^3 + \ldots\ldots + k^3$

$\Rightarrow \left(\frac{k(k+1)}{2}\right)^2 = (\Sigma k)^2$

$= 325^2$

$= 105625$

18. $2A + B = \begin{pmatrix} 14 & 16 & 12 \\ 2 & 6 & 18 \\ -8 & 6 & -2 \end{pmatrix} + \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$

$= \begin{pmatrix} 18 & 27 & 9 \\ 1 & 8 & 22 \\ -1 & 11 & -2 \end{pmatrix}$

19. $\Rightarrow \Delta = b^2 - 4ac$ $\Rightarrow \Delta = (11)^2 - 4\,(15)\,(2)$

$\Rightarrow \Delta = 121 - 120$ $\Rightarrow \Delta = 1$

Therefore $\Delta > 0$,

$\therefore$ **The roots are real and unequal.**

20. By Pythagoras theorem we have

$PN^2 = PE^2 + NE^2$

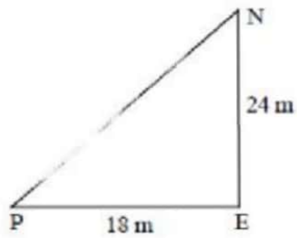
$\Rightarrow x^2 = 18^2 + 24^2$

$\Rightarrow x^2 = 324 + 576$

$\Rightarrow x^2 = 900$

$\Rightarrow X = \sqrt{900}$

$\Rightarrow$ **X = 30 m.**



21. **Slope of the first line**

$\Rightarrow x - 2y + 3 = 0$

$\Rightarrow$ Slope of straight line $(m_1) = \frac{-a}{b} = \frac{-1}{-2}$

$= \frac{1}{2}$

Slope of the second line

$\Rightarrow 6x + 3y + 8 = 0$

$\Rightarrow$ Slope of straight line $(m_2) = \frac{-a}{b} = \frac{-6}{3}$

$\therefore m_1 \times m_2 = \frac{1}{2} \times \frac{-6}{3}$

$= -1$

Therefore the lines are perpendicular.

22. Slope of line $(m) = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow m = \frac{0 - \sqrt{5}}{0 - 5}$

$\Rightarrow m = \frac{-\sqrt{5}}{-5} \Rightarrow m = \frac{\sqrt{5}}{5} = \frac{1}{\sqrt{5}}$

23. $\Rightarrow$ LHS $= \tan^2\theta - \sin^2\theta$

$= \frac{\sin^2\theta}{\cos^2\theta} - \sin^2\theta = \frac{\sin^2\theta - \sin^2\theta\cos^2\theta}{\cos^2\theta}$

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

$= \frac{\sin^2\theta}{\cos^2\theta} \times \sin^2\theta$ $= \tan^2\theta\sin^2\theta$ **= RHS.**

24. Surface area of Sphere $= 154\ m^2$

$\Rightarrow 4\pi r^2 = 154$ $\Rightarrow 4 \times \frac{22}{7} \times r^2 = 154$

$\Rightarrow r^2 = 154 \times \frac{7}{22} \times \frac{1}{4} = \frac{49}{4}$ $\Rightarrow r = \frac{7}{2}$

$\Rightarrow$ Diameter $= 2r = 2 \times \frac{7}{2}$

$\therefore$ **The diameter of the sphere = 7cm**

25. Ratio of their volumes

$\Rightarrow \frac{4}{3}\pi R^3 : \frac{4}{3}\pi r^3$

$\Rightarrow \pi R^3 : \pi r^3$

$\Rightarrow R^3 : r^3$

$\Rightarrow 4^3 : 7^3$ $=$ **64 : 243**

26. S.D. of first 21 natural numbers

$= \sqrt{\frac{n^2-1}{12}} = \sqrt{\frac{21^2-1}{12}} = \sqrt{\frac{441-1}{12}}$

$= \sqrt{\frac{440}{12}} = \sqrt{36.66}$ **= 6.05**

27. Sample Space (S)

= { HHH, HHT, HTH, THH, TTT, TTH, THT, HTT }

n(S) = 8

Let A = probability of getting two consecutive tails

A = { HTT, TTH, TTT }

$\Rightarrow n(A) = 3 \quad \Rightarrow P(A) = \frac{n(A)}{n(S)} = \frac{3}{8}$

28. $p^2 \times q^1 \times r^4 \times s^3 = 315000$

$= 3^2 \times 7^1 \times 5^4 \times 2^3$

∴ p = 3, q = 7, r = 5, s = 2

III ANSWER ANY 10 ONLY

29. **Given : A = { 1, 2, 3, 4, 5, 6, 7 }, B = { 2, 3, 5, 7 } and C = { 2,}**

LHS : A x (B – C)

(B – C) = { 2, 3, 5, 7 } – { 2 }

= { 3, 5, 7 }

A x (B – C)= { 1, 2, 3, 4, 5, 6, 7 } x { 3, 5, 7 }

=(1,3),(2,3),(3,3),(4,3),(5,3),(6,3),(7,3),(1,5),(2,5),(3,5),(4,5),(5,5),(6,5),(7,5),(1,7),(2,7),(3,7),(4,7), (5,7),(6,7),(7,7)} ----------------------------(1)

RHS : (A x B) – (A x C)

(A x B) = { { 1, 2, 3, 4, 5, 6, 7 } x{ 2, 3, 5, 7 }

= {(1,2),(1,3),(1,5),(1,7),(2,2),(2,3),(2,5),(2,7),(3,2),(3,3),(3,5),(3,7),(4,2),(4,3),(4,5),(4,7),(5,2),(5,3),(5,5),(5,7),(6,2),(6,3),(6,5),(6,7),(7,2),(7,3),(7,5),(7,7)}

(A x C)= { 1, 2, 3, 4, 5, 6, 7 } x { 2 }

= { (1,2),(2,2),(3,2),(4,2),(5,2),(6,2),(7,2)}

(AxB) – (AxC) =

{(1,3),(2,3),(3,3),(4,3),(5,3),(6,3),(7,3),(1,5),(2,5),(3,5),(4,5),(5,5),(6,5),(7,5),(1,7),(2,7),(3,7),(4,7),(5,7),(6,7),(7,7)} ----------------------------(2)

From (1) and (2) LHS = RHS

30. (i) If x = 1, f(1) = 3(1) + 2 = 5

If x = 2, f(2) = 3(2) + 2 = 8

If x = 3, f(3) = 3(3) + 2 = 11

The images of 1, 2, 3, are 5, 8, 11 respectively.

If x is the pre image of 29, then f(x) = 29

3x + 2 = 29 ⇒ **x = 9**

Similarly x is the pre image of 53, then f(x) = 53

3x + 2 = 53 ⇒ **x = 17**

The pre – images of 29 and 53 are 9 and 17 respectively.

Since different elements of $\mathbb{N}$ have different images in the co – domain, the function f is one – one function.

The co – domain f is $\mathbb{N}$

But the range of f = { 5, 8, 11, 14, 17, ...} is a proper subset of $\mathbb{N}$.

∴ f is not an onto function. That is f is an into function. Thus f is one – one and into function.

31. $S_1 = \frac{n}{2}(2a + (n – 1) d)$

$S_2 = \frac{2n}{2}(2a + (2n – 1) d)$

$S_3 = \frac{3n}{2}(2a + (3n – 1) d)$

$3 (S_2 – S_1)$

$= 3 [\frac{2n}{2}(2a + (2n – 1) d) – \frac{n}{2}(2a + (n – 1) d)]$

$= \frac{3n}{2} [(4a + 2(2n – 1) d) – (2a + (n – 1) d)]$

$= \frac{3n}{2} [2a + 3nd – d]$

$= \frac{3n}{2} [2a + (3n – 1)d]$

Therefore **$3 (S_2 – S_1) = S_3$**

32. 3 + 33 + 3 + ...,. + n terms

= 3 (1 + 11 + 111 + ...+ n terms)

$S_n = \frac{3}{9}$ (9 + 99 + 999 + ...+ n terms)

$= \frac{3}{9}$ ((10 + 10^2 + 10^3 + ... + n terms) – n)

$$S_n = \frac{a(r^n-1)}{r-1}$$

$S_n = \frac{1}{3}\left(\frac{10(10^n-1)}{9} - n\right)$

$S_n = \frac{10(10^n-1)}{27} - \frac{n}{3}$

33. Let α & β are the roots of the equation

$2y^2 – ay + 64 = 0$

α = 2β (given) ----------------------------(1)

$\alpha + \beta = \frac{-b}{a}$ ----------------------------(2)

$= \frac{-(-a)}{2} = \frac{a}{2} \qquad \alpha\beta = \frac{c}{a} = \frac{64}{2}$

$\alpha\beta = 32$

By (1) $\Rightarrow 2\beta \times \beta = 32$

$2\beta^2 = 32$

$\beta = \sqrt{16}$ $\quad$ $\beta = \pm 4$

But $\alpha = 2\beta$ (given)

$\Rightarrow \alpha = 2(4)$ $\quad$ $\Rightarrow \alpha = 8$

If $\alpha = 8$ & $\beta = 4$

$\Rightarrow \alpha + \beta = \frac{a}{2}$

$\Rightarrow 8 + 4 = \frac{a}{2}$ $\quad$ $\Rightarrow a = 24$

If $\alpha = 8$ & $\beta = -4$

$\Rightarrow \alpha + \beta = \frac{a}{2}$

$\Rightarrow 8 - 4 = \frac{a}{2}$ $\quad$ $\Rightarrow a = 8$

Therefore a = 8 (or) 24

34. $x = \frac{a^2 + 3a - 4}{3a^2 - 3}$

$= \frac{(a+4)(a-1)}{3(a^2-1)} = \frac{(a+4)}{3(a+1)}$

$x^2 = \left(\frac{(a+4)}{3(a+1)}\right)^2 = \frac{(a+4)^2}{9(a+1)^2}$

$y = \frac{a^2 + 2a - 8}{2a^2 - 2a - 4}$

$= \frac{(a+4)(a-2)}{2(a^2-a-2)} = \frac{(a+4)}{2(a+1)}$

$y^2 = \left(\frac{(a+4)}{2(a+1)}\right)^2 = \frac{(a+4)^2}{4(a+1)^2}$

$y^{-2} = \frac{4(a+1)^2}{(a+4)^2}$

$x^2y^{-2} = \frac{(a+4)^2}{9(a+1)^2} \times \frac{4(a+1)^2}{(a+4)^2}$

$x^2y^{-2} = \frac{4}{9}$

35. $A^2 = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} \times \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix}$

$5A = \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix}$ $\quad$ $7\,I_2 = \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$

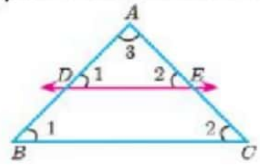
$A^2 - 5A + 7\,I_2 = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix} - \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix} + \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$

$\mathbf{A^2 - 5A + 7\,I_2} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} = 0$

36. **Statement :** If a straight line is drawn parallel to one side of a triangle intersecting the other two sides, then divides the sides in the same ratio.

Given : In a Δ ABC, D is a point on AB and E is a point on AC

To Prove : $\frac{AD}{DB} = \frac{AE}{EC}$



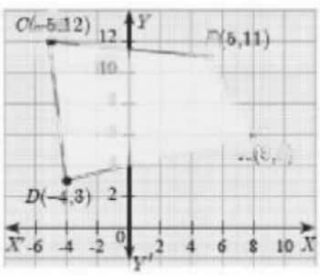
Construction:

Draw a line DE || BC

No.	Statement	Reason
1.	∠ABC = ∠ADE = ∠1	Corresponding angles are equal because DE ‖ BC
2.	∠ACB = ∠AED = ∠2	Corresponding angles are equal because DE ‖ BC
3.	∠DAE = ∠BAC = ∠3	Both triangles have a common angle
	ΔABC ~ ΔADE	By AAA similarity
	$\frac{AB}{AD} = \frac{AC}{AE}$	Corresponding sides are proportional
	$\frac{AD + DB}{AD} = \frac{AE + EC}{AE}$	Split AB and AC using th epoints D and E.
4.	$1 + \frac{DB}{AD} = 1 + \frac{EC}{AE}$	On simplification
	$\frac{DB}{AD} = \frac{EC}{AE}$	Cancelling 1 on both sides
	$\frac{AD}{DB} = \frac{AE}{EC}$	Taking reciprocals
	Hence proved	

37. Area of the quadrilateral

$= \frac{1}{2}\begin{Bmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{Bmatrix}$ Sq. Units



Area of quadrilateral

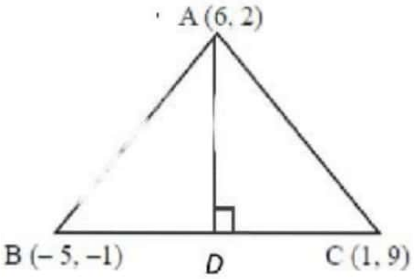
$= \frac{1}{2}\begin{Bmatrix} 8 & 5 & -5 & -4 & 8 \\ 6 & 11 & 12 & 3 & 6 \end{Bmatrix}$

$= \frac{1}{2}[(88 + 60 - 15 - 24) - (30 - 55 - 48 + 24)]$

$= \frac{1}{2}[(109) - (-49)]$ $= \frac{1}{2}(109 + 49)$

$= \frac{1}{2}(158)$ $= 79$

Therefore area of quadrilateral = 79 sq. units.

38. 

Equation of Median AM

Here 'M' is the mid point of BC

Therefore $x_1 = -5$, $x_2 = 1$, $y_1 = -1$ and $y_2 = 9$

Therefore mid point of BC = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{-5+1}{2}, \frac{-1+9}{2}\right)$ $= \left(\frac{-4}{2}, \frac{8}{2}\right)$ **= (-2, 4)**

Therefore equation of median AM is

A = (6,2) and M = (-2, 4)

$\Rightarrow \frac{y-y_1}{y_2-y_1} = \frac{x-x_1}{x_2-x_1}$

$\Rightarrow \frac{y-2}{4-2} = \frac{x-6}{-2-6}$

$\Rightarrow -8y + 16 = 2x - 12$

$\Rightarrow \mathbf{x + 4y - 14 = 0}$

39. $\tan 30^0 = \frac{1800}{BD}$

$BD = 1800\sqrt{3}$

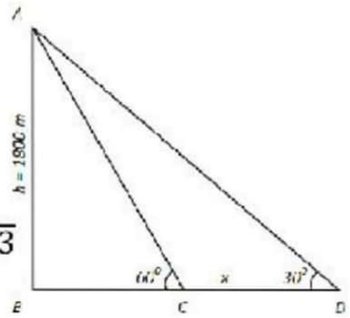
$\tan 60^0 = \frac{1800}{BC}$

$BC = 600\sqrt{3}$

$DC = 1800\sqrt{3} - 600\sqrt{3}$

$DC = 1200\sqrt{3}$

= 2078.4m



40. $\Rightarrow$ **Volume of frustum**

$= \frac{1}{3}\pi h(R^2 + r^2 + Rr)$ **Cubic units.**

$= \frac{1}{3} \times \pi \times 45 (28^2 + 7^2 + 28 \times 7)$

$= \frac{1}{3} \times \pi \times 45 (784 + 49 + 196)$

$= \frac{1}{3} \times \pi \times 45 \times 1029$

= 15435 π cm³ (or)

$= 15435 \times \frac{22}{7}$ **= 48510 cm³**

Therefore the volume of frustum = 48510 cm³

41. S= {(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),
(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),
(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),
(4,1),(4,2),(4,3),(4,4),(4,5),(4,6),
(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),
(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)}

$\Rightarrow$ **n(S) = 36**

Let A be the event of getting even number on the 1st die

A = { (2,1),(2,2),(2,3),(2,4),(2,5),(2,6)
(4,1),(4,2),(4,3),(4,4),(4,5),(4,6)
(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)}

$\Rightarrow n(A) = 18$

$P(A) = \frac{n(A)}{n(S)} = \mathbf{\frac{18}{36}}$

Let B be the probability of getting face sum 8

B = {(2, 6), (3, 5), (4, 4), (5, 3), (6, 2)}

$\Rightarrow n(B) = 5$

$P(B) = \frac{n(B)}{n(S)} = \mathbf{\frac{5}{36}}$

$(A \cap B)$ = { (2, 6), (4, 4), (6, 2)}

$\Rightarrow n(A \cap B) = 3$

$P(A \cap B) = \frac{n(A \cap B)}{n(S)} = \mathbf{\frac{3}{36}}$

$P(A \cup B) = P(A) + P(B) - P(A \cap C)$

$\Rightarrow P(A \cup B) = \frac{18}{36} + \frac{5}{36} - \frac{3}{36} = \mathbf{\frac{5}{9}}$

42. Volume of cone $= 1005\frac{5}{7}$ cu.cm

$\frac{1}{3}\pi r^2 h = \frac{7040}{7}$ ----------------(1)

Base area of cone= $201\frac{1}{7}$ sq.cm

$\pi r^2 = \frac{1408}{7}$ ----------------(2)

$\frac{1}{3} \times \frac{1408}{7} \times h = \frac{7040}{7}$ (by (2))

$h = \frac{7040 \times 7 \times 3}{7 \times 1408}$ **= 15cm**

$\pi r^2 = \frac{1408}{7}$ $\Rightarrow \frac{22}{7} \times r^2 = \frac{1408}{7}$

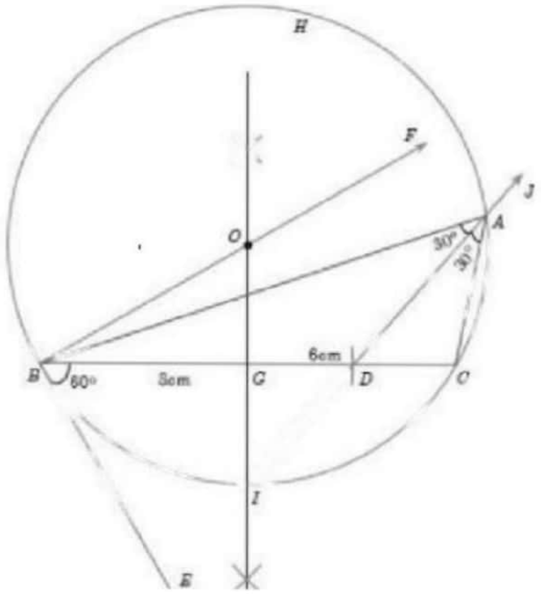
r = 8 cm

Slant height (l) = $\sqrt{h^2 + r^2}$

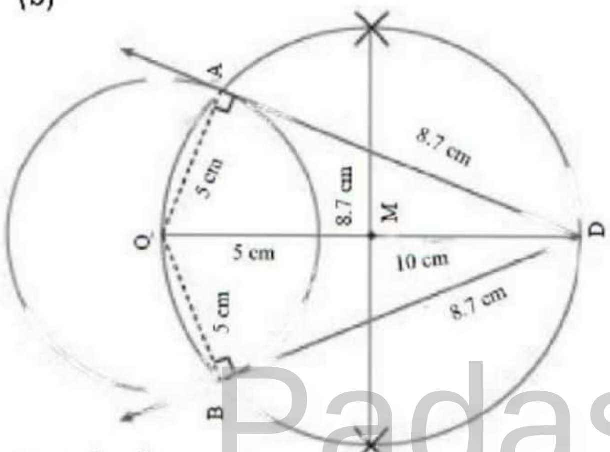
$\Rightarrow l = \sqrt{15^2 + 8^2}$ $\Rightarrow l = \sqrt{225 + 64}$

$\Rightarrow l = \sqrt{289}$ $\Rightarrow \mathbf{l = 17\ cm}$

43. (a)



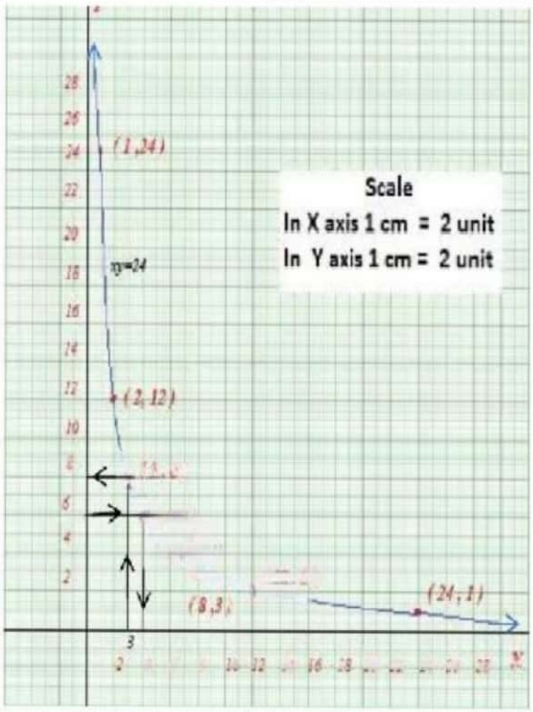
(b)



Length of tangents = 8.7 cm

44. (a)

X	1	2	3	4	6	8	12	24
y	24	12	8	6	4	3	2	1



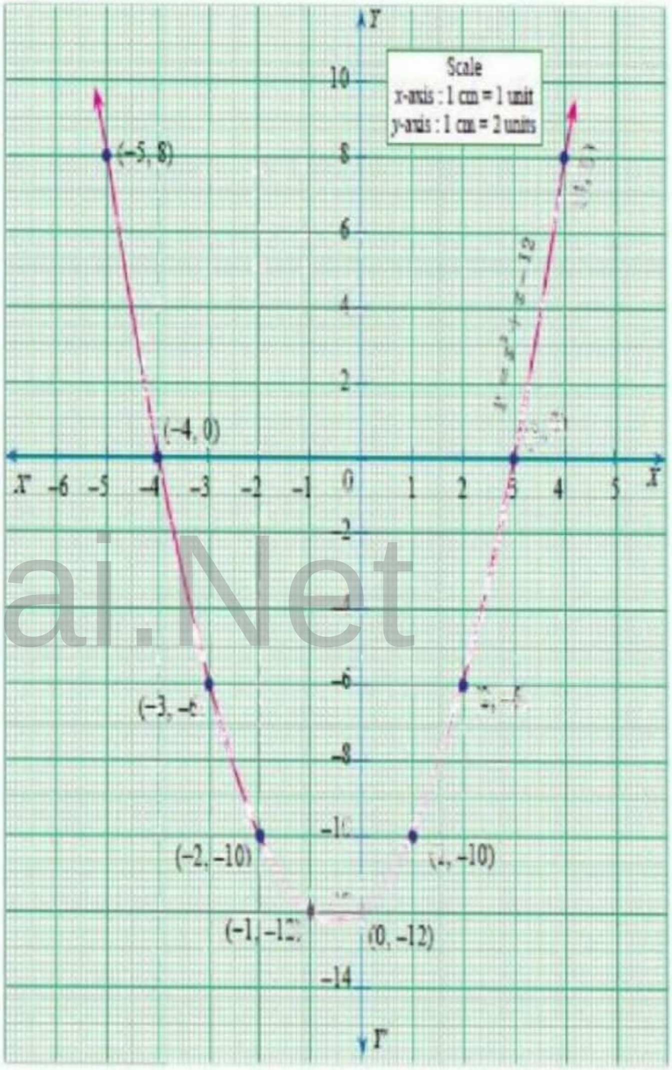
Solution: From the graph

(i) If x = 3 then, **y = 8**

(ii) If y = 6 then, **x = 4**

(b)

X	-5	-4	-3	-2	-1	0	1	2	3	4	5
X^2	25	16	9	4	1	0	1	4	9	16	25
X	-5	-4	-3	-2	-1	0	1	2	3	4	5
-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Y	8	0	-6	-10	-12	-12	-10	-6	0	8	18



Solution set = { -4, 3 }

Therefore the roots are real and unequal.