

5

DISTANCE BETWEEN TWO POINTS

①

Class VIII Mathematics

IIT FOUNDATION⁺

TEACHING TASK

01. $A(x_1, y_1), B(x_2, y_2)$

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

$$= \sqrt{(at_2^2 - at_1^2)^2 + (2at_2 - 2at_1)^2}$$

$$= \sqrt{a^2(t_2^2 - t_1^2)^2 + 4a^2(t_2 - t_1)^2}$$

$$= \sqrt{a^2(t_2 + t_1)^2(t_2 - t_1)^2 + 4a^2(t_2 - t_1)^2}$$

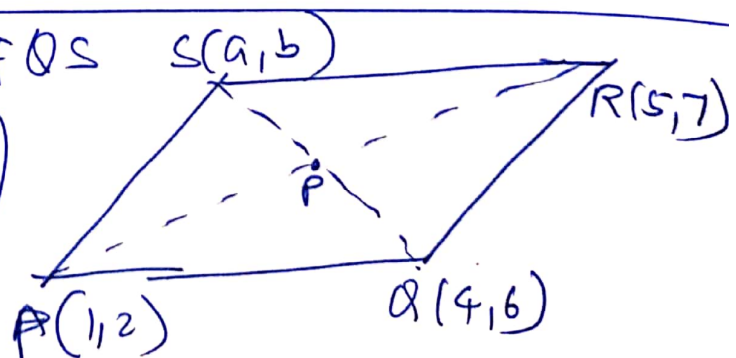
$$= a(t_2 - t_1) \sqrt{(t_2 + t_1)^2 + 4}$$

Ans: A

02 mid-point of PR = mid pt of QS

$$\left(\frac{1+5}{2}, \frac{2+7}{2}\right) = \left(\frac{a+4}{2}, \frac{b+6}{2}\right)$$

$$\Rightarrow a = 2, b = 3$$



Ans: C

03 $P(at^2, 2at), Q\left(\frac{a}{t^2}, \frac{2a}{t}\right), S(a, 0)$ (2)

$$\begin{aligned} SP &= \sqrt{(a - at^2)^2 + (0 - 2at)^2} \\ &= \sqrt{a^2(1 - t^2)^2 + 4a^2t^2} \\ &= \sqrt{a^2[(1 - t^2)^2 + 4t^2]} \\ &= a\sqrt{(1 + t^2)^2} = a(1 + t^2) \end{aligned}$$

$$\begin{aligned} SQ &= \sqrt{\left(\frac{a}{t^2} - a\right)^2 + \left(\frac{2a}{t} - 0\right)^2} \\ &= \sqrt{a^2\left(\frac{1}{t^2} - 1\right)^2 + \frac{4a^2}{t^2}} \\ &= a\sqrt{\left(\frac{1}{t^2} - 1\right)^2 + \frac{4}{t^2}} \\ &= a\sqrt{\left(\frac{1}{t^2} + 1\right)^2} \\ &= a\left(\frac{1}{t^2} + 1\right) \end{aligned}$$

$$\begin{aligned} \frac{1}{SP} + \frac{1}{SQ} &= \frac{1}{a(1 + t^2)} + \frac{1}{a\left(\frac{1}{t^2} + 1\right)} \\ &= \frac{1}{a(1 + t^2)} + \frac{t^2}{a(1 + t^2)} \\ &= \frac{1 + t^2}{a(1 + t^2)} = \frac{1}{a} \end{aligned}$$

Ans: A

04 let $C(x, y)$, $A(3, 4)$, $B(7, 7)$ (3)
option verification method

let $C(-5, -2)$.

$$AC = \sqrt{(3+5)^2 + (4+2)^2} \\ = \sqrt{64 + 36} = \sqrt{100} = 10 \quad \text{Ans: D}$$

05 $A(1, 1)$, $B(-2, 7)$, $C(3, -3)$

$$AB = \sqrt{(1+2)^2 + (1-7)^2} = \sqrt{9 + 36} = \sqrt{45} = 3\sqrt{5}$$

$$BC = \sqrt{(3+2)^2 + (-3-7)^2} = \sqrt{25 + 100} = \sqrt{125} = 5\sqrt{5}$$

$$AC = \sqrt{(3-1)^2 + (-3-1)^2} = \sqrt{4 + 16} = \sqrt{20} = 2\sqrt{5}$$

$$\therefore AB + AC = BC$$

A, B, C are collinear

Ans: C

06 $A(a \sin \alpha, -b \cos \alpha)$, $B(-a \cos \alpha, b \sin \alpha)$
 $\begin{matrix} x_1 & y_1 & x_2 & y_2 \end{matrix}$

$$AB = \sqrt{(a \sin \alpha + a \cos \alpha)^2 + (b \sin \alpha + b \cos \alpha)^2}$$

$$= \sqrt{(a^2 + b^2) \sin^2 \alpha + (a^2 + b^2) \cos^2 \alpha + 2(a^2 + b^2) \sin \alpha \cos \alpha}$$

$$= \sqrt{(a^2 + b^2) [\sin^2 \alpha + \cos^2 \alpha + 2 \sin \alpha \cos \alpha]}$$

$$= \sqrt{a^2 + b^2} \cdot (\sin \alpha + \cos \alpha)$$

Ans: C

07.

$$A(2, 1), B(1, -2), P(x, y)$$

(4)

$$PA = PB$$

$$\Rightarrow PA^2 = PB^2$$

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

$$\Rightarrow x^2 - 4x + 4 + y^2 - 2y + 1 = x^2 - 2x + 1 + y^2 + 4y + 4$$

$$\Rightarrow 2x + 6y = 0$$

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

Ans: D

08

$$x^2 + 2ax - b^2 = 0$$

$$\begin{array}{c} \swarrow \quad \searrow \\ x_1 \quad x_2 \end{array}$$

$$x_1 + x_2 = -2a$$

$$x_1 \cdot x_2 = -b^2$$

$$y^2 + 2py + q^2 = 0$$

$$\begin{array}{c} \swarrow \quad \searrow \\ y_1 \quad y_2 \end{array}$$

$$y_1 + y_2 = -2p$$

$$y_1 \cdot y_2 = -q^2$$

$$A(x_1, y_1), B(x_2, y_2)$$

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

$$= \sqrt{(x_1 + x_2)^2 - 4x_1x_2 + (y_1 + y_2)^2 - 4y_1y_2}$$

$$= \sqrt{(-2a)^2 - 4(-b^2) + (-2p)^2 - 4(-q^2)}$$

$$= \sqrt{4a^2 + 4b^2 + 4p^2 + 4q^2}$$

$$= 2\sqrt{a^2 + b^2 + p^2 + q^2}$$

Ans: B

Q9 $A(3, 4)$, $B(-2, 3) \rightarrow$ Equilateral triangle (5)
 $x_1 \ y_1 \quad x_2 \ y_2$

$$\begin{aligned}\text{Third vertex} &= \left(\frac{x_1 + x_2 \pm \sqrt{3}(y_2 - y_1)}{2}, \frac{y_1 + y_2 \mp \sqrt{3}(x_2 - x_1)}{2} \right) \\&= \left(\frac{3 - 2 \pm \sqrt{3}(3 - 4)}{2}, \frac{4 + 3 \mp \sqrt{3}(-2 - 3)}{2} \right) \\&= \left(\frac{1 \pm \sqrt{3}(-1)}{2}, \frac{7 \mp \sqrt{3}(-5)}{2} \right) \\&= \left(\frac{1 \mp \sqrt{3}}{2}, \frac{7 \pm 5\sqrt{3}}{2} \right) \\&= \left(\frac{1 - \sqrt{3}}{2}, \frac{7 + 5\sqrt{3}}{2} \right), \left(\frac{1 + \sqrt{3}}{2}, \frac{7 - 5\sqrt{3}}{2} \right)\end{aligned}$$

Ans: D



10. $P(k-1, 2), A(3, k), B(k, 5)$ (6)

$$PA = PB$$

$$\Rightarrow PA^2 = PB^2$$

$$\Rightarrow [(k-1-3)^2 + (2-k)^2] = [(k-1-k)^2 + (2-5)^2]$$

$$\Rightarrow (k-4)^2 + (2-k)^2 = (-1)^2 + (-3)^2$$

$$\Rightarrow k^2 - 8k + 16 + 4 - 4k + k^2 = 1 + 9$$

$$\Rightarrow 2k^2 - 12k + 20 = 0$$

$$\Rightarrow k^2 - 6k + 10 = 0$$

$$\Rightarrow (k-1)(k-5) = 0$$

$$\Rightarrow k = 1, 5$$

Ans: B

11. $A(5, 7), B(2, x)$

$$AB = 5$$

$$\Rightarrow AB^2 = 25$$

$$\Rightarrow (2-5)^2 + (x-7)^2 = 25$$

$$\Rightarrow 9 + x^2 - 14x + 49 = 25$$

$$\Rightarrow x^2 - 14x + 33 = 0$$

$$\Rightarrow (x-11)(x-3) = 0 \Rightarrow x = 3, 11 \quad \text{Ans: A, C}$$

12. $A(-4, 0), B(4, 0) \rightarrow \text{Equilateral triangle}$
 $\begin{matrix} x_1 & y_1 \\ x_2 & y_2 \end{matrix}$

$$\begin{aligned} \text{Third vertex} &= \left(\frac{x_1 + x_2 \pm \sqrt{3}(y_2 - y_1)}{2}, \frac{y_1 + y_2 \pm \sqrt{3}(x_2 - x_1)}{2} \right) \\ &= \left(\frac{-4 + 4 \pm \sqrt{3}(0 - 0)}{2}, \frac{0 + 0 \pm \sqrt{3}(4 - (-4))}{2} \right) \\ &= (0, \pm 4\sqrt{3}) \end{aligned}$$

Ans: A, B

13

Statement I:

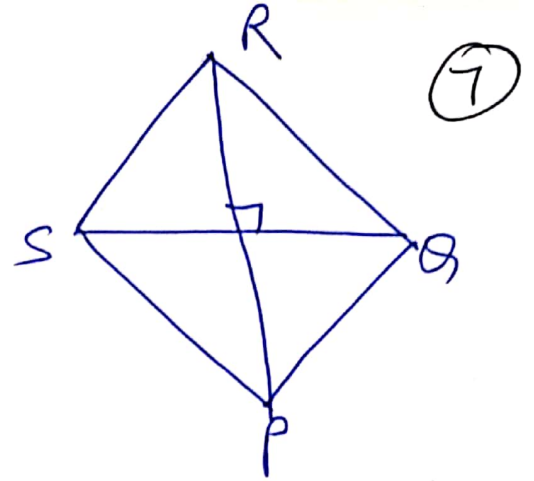
$$\begin{aligned}
 PR &= \sqrt{(-2-2)^2 + (3+1)^2} \\
 &= \sqrt{16 + 16} \\
 &= \sqrt{32} = 4\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 SQ &= \sqrt{(3+3)^2 + (4+2)^2} \\
 &= \sqrt{36 + 36} = 6\sqrt{2}
 \end{aligned}$$

$PR \neq SQ \Rightarrow$ Rhombus (True)

Statement II: Conceptual (True)

Ans: A

14. Statement I: $A(5, 2), B(7, 9), C(9, 16)$

$$AB = \sqrt{(7-5)^2 + (9-2)^2} = \sqrt{53}$$

$$BC = \sqrt{(9-7)^2 + (16-9)^2} = \sqrt{53}$$

$$CA = \sqrt{(9-5)^2 + (16-2)^2} = \sqrt{212} = 2\sqrt{53}$$

$$\therefore AB + BC = CA$$

Hence, A, B, C are collinear (True)

Statement II: Conceptual (True)

Ans: A

17

 $A(2, 7), B(8, 3), C(14, -1)$

$$AB = \sqrt{(8-2)^2 + (3-7)^2} = \sqrt{52}$$

$$BC = \sqrt{(14-8)^2 + (-1-3)^2} = \sqrt{52}$$

$$CA = \sqrt{(14-2)^2 + (-1-7)^2} = 2\sqrt{52}$$

$$\therefore AB + BC = CA$$

Ans: A

18

$$A(-1, 3), B(2, p), C(5, -1)$$

(8)

$$\text{Area} = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)| = 0$$

$$\Rightarrow -1(p+1) + 2(-1-3) + 5(3-p) = 0$$

$$\Rightarrow p = 1$$

Ans: A

21

mid-point of BD = mid-point of AC

$$\therefore \frac{x+8}{2} = \frac{2+5}{2}$$

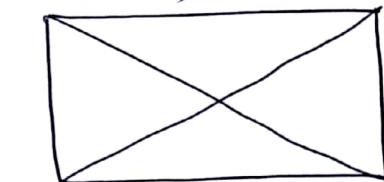
$$\Rightarrow x = -1$$

$$\Rightarrow 2x = -2$$

$$\Rightarrow 2x+3 = -2+3 = 1$$

D(x, y)

C(5, 7)



A(2, -2)

B(8, 4)

Ans: 1

23

$$a) \sqrt{(-1+6)^2 + (-5-1)^2} = \sqrt{25 + 144} = 13$$

$$b) A(4, 3), B(x, 5), C(2, 3)$$

$$CA = CB$$

$$\Rightarrow CA^2 = CB^2$$

$$\Rightarrow (4-2)^2 + (3-3)^2 = (x-2)^2 + (5-3)^2$$

$$\Rightarrow 4 = (x-2)^2 + 4$$

$$\Rightarrow x = 2$$

$$c) PA = PB \Rightarrow PA^2 = PB^2$$

$$\Rightarrow (x-2)^2 + (0+5)^2 = (x+2)^2 + (0-9)^2$$

$$\Rightarrow x = 7$$

$$d) OA^2 = 3^2 + 4^2 = 25$$

Ans: s, p, q, r



LEARNER'S TASK

(9)

01. $A(a, 0), B(b, 0)$

$$AB = \sqrt{(b-a)^2 + 0^2} = \sqrt{(a-b)^2} = |a-b|$$

Ans: D

02. $A(0, a), B(0, b)$

$$AB = \sqrt{(0-0)^2 + (b-a)^2} = \sqrt{(a-b)^2} = |a-b|$$

Ans: D

03. $A(-3, 4), O(0, 0)$

$$OA = \sqrt{(-3)^2 + 4^2} = \sqrt{25} = 5$$

Ans: B

04. $A(x_1, y_1), B(x_2, y_2)$

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

Ans: B

05. $A(a, b), O(0, 0)$

$$AO = \sqrt{a^2 + b^2}$$

Ans: B

06. $A(a, 0)$

Distance from y -axis = $|x| = |a|$

Ans: C

07. $A(0, b)$

Distance from y -axis = $|x| = |0| = 0$

Ans: A

08. $A(a, 0), B(0, b)$
 $x_1, y_1 \quad x_2, y_2$

$$AB = \sqrt{(0-a)^2 + (b-0)^2} = \sqrt{a^2 + b^2}$$

Ans: A

09. $P(x_1, y_1), Q(x_2, y_2)$

$$= |x_1 - x_2|$$

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = |x_2 - x_1|$$

Ans: D



10 $A = (-3, 4)$ (10)
 Distance from y -axis = $|x| = |-3| = 3$ Ans: A

JEE MAINS LEVEL

01. $P(x, y)$, $A(a+b, b-a)$, $B(a-b, a+b)$

$$\Rightarrow PA = PB$$

$$\Rightarrow PA^2 = PB^2$$

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

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

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

$$\Rightarrow (a+b)x + (b-a)y + (a-b)x + (a+b)y = 0$$

$$\Rightarrow [a+b+a-b]x + [b-a+a+b]y = 0$$

$$\Rightarrow 2ax + 2by = 0$$

$$\Rightarrow ax + by = 0$$

Ans: D

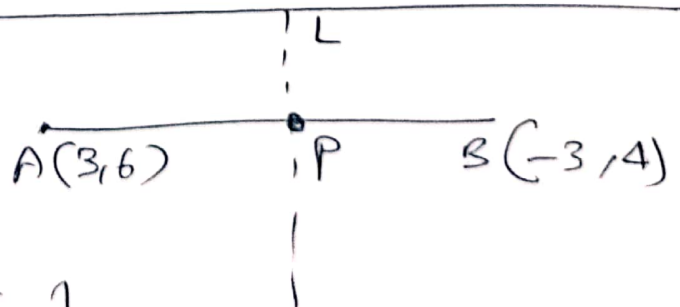
02 $P = \left(\frac{3-3}{2}, \frac{6+4}{2} \right)$

$$P = (0, 5)$$

$$\text{slope of } AB = \frac{4-6}{-3-3} = \frac{1}{3}$$

$$\text{slope of } L = -\frac{1}{m} = -3$$

$$\text{Eqn. } y - y_1 = m(x - x_1)$$



$$y - 5 = -3(x - 0)$$

$$3x + y - 5 = 0$$

Ans: B

03. Point on y -axis $P(0, y)$, $A(6, 5)$, $B(-4, 3)$ (11)

$$PA = PB \Rightarrow$$

$$\Rightarrow PA^2 = PB^2$$

$$\Rightarrow (6-0)^2 + (5-y)^2 = (-4-0)^2 + (3-y)^2$$

$$\Rightarrow 36 + 25 - 10y + y^2 = 16 + 9 - 6y + y^2$$

$$\Rightarrow y = 9 \quad \therefore (0, 9)$$

Ans: D

04. Let $P(2x, x)$, $Q(2, -5)$, $R(-3, 6)$

$$\Rightarrow PQ = PR$$

$$\Rightarrow PQ^2 = PR^2$$

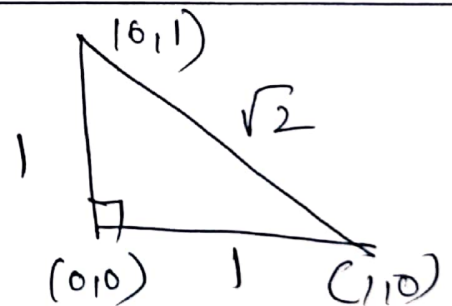
$$\Rightarrow (2x-2)^2 + (x+5)^2 = (2x+3)^2 + (x-6)^2$$

$$\Rightarrow x = 8$$

$$\therefore P(16, 8)$$

Ans: B

05. Perimeter $= 1 + 1 + \sqrt{2}$
 $= 2 + \sqrt{2}$



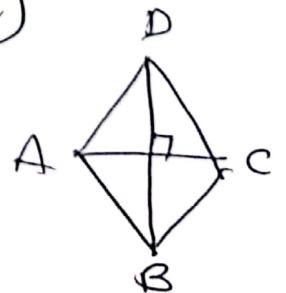
Ans: B

06. $A(2, -1)$, $B(3, 4)$, $C(-2, 3)$, $D(-3, -2)$

We observe $AB = BC = CA = DA$

$$AC \neq BD$$

Hence, ABCD is a Rhombus, but not square.



Ans: B

07

$$A(0, -1), B(-2, 0), C(-1, -3)$$

(12)

We observe

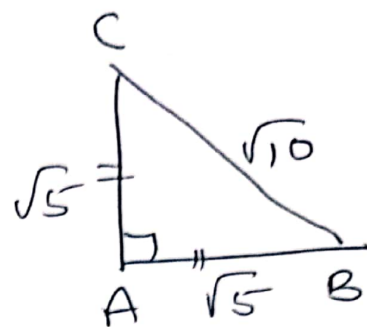
$$AB = \sqrt{4 + 1} = \sqrt{5}$$

$$BC = \sqrt{1 + 9} = \sqrt{10}$$

$$CA = \sqrt{1 + 4} = \sqrt{5}$$

$$\text{i.e. } BC^2 = AB^2 + CA^2$$

It is right angled isosceles triangle Ans: B

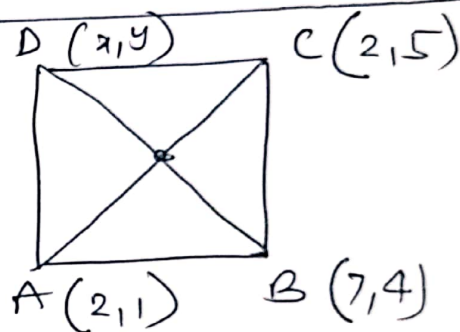


08

mid-point of BP = mid-point of AC

$$\Rightarrow \left(\frac{x+7}{2}, \frac{y+4}{2} \right) = \left(\frac{2+2}{2}, \frac{1+5}{2} \right)$$

$$\Rightarrow (x, y) = (-3, 2)$$



Ans: C

09. $A(x_1, y_1), B(x_2, y_2) \rightarrow$ Equilateral triangle

$$\text{Third vertex} = \left(\frac{x_1 + x_2 \pm \sqrt{3}(y_2 - y_1)}{2}, \frac{y_1 + y_2 \mp \sqrt{3}(x_2 - x_1)}{2} \right)$$

$$= \left(\frac{-4 + 4 \pm \sqrt{3}(0-0)}{2}, \frac{-4 + 0 \mp \sqrt{3}(0-0)}{2} \right)$$

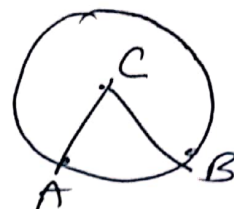
$$= (0, \pm 4\sqrt{3})$$

Ans: A

10

$$C(2, -3y), A(-1, y), B(5, 7)$$

(13)



$$CA = CB$$

$$\Rightarrow CA^2 = CB^2$$

$$\Rightarrow (2+1)^2 + (-3y-y)^2 = (2-5)^2 + (-3y-7)^2$$

$$\Rightarrow 9 + 16y^2 = 9 + 9y^2 + 42y + 49$$

$$\Rightarrow 7y^2 - 42y - 49 = 0$$

$$\Rightarrow y - 6y - 7 = 0$$

$$\Rightarrow (y-7)(y+1) = 0$$

$$\Rightarrow y = -1 \text{ or } 7$$

$$\therefore \text{Let } y = -1$$

$$C(2, 3), A(-1, -1)$$

$$r = CA = \sqrt{(2+1)^2 + (3+1)^2} = 5$$

Ans: B

$$11. A(x_1, y_1), B(x_2, y_2)$$

All the four options are correct. Ans: A, B, C, D

$$13. \text{Statement I: } P(2, 2), A(-2, k), B(-2k, -3)$$

$$PA = PB$$

$$\Rightarrow PA^2 = PB^2$$

$$\Rightarrow (-2-2)^2 + (k-2)^2 = (2+2k)^2 + (2+3)^2$$

$$\Rightarrow k = -1 \text{ or } -3 \quad (\text{True})$$

Statement I: Not always true.

Ans: C



17

$$P(x, y), A(3, 6), B(-3, 4)$$

(14)

$$PA = PB$$

$$\Rightarrow PA^2 = PB^2$$

$$\Rightarrow (x+3)^2 + (y-6)^2 = (x+3)^2 + (y-4)^2$$

$$\Rightarrow -6x + 9 + 12y + 36 = 6x + 9 - 8y + 16$$

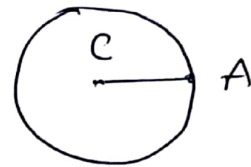
$$\Rightarrow 12x + 4y + 20 = 0$$

$$\Rightarrow 3x + y - 5 = 0$$

Ans: B

21

$$C(2a, a-7), A(11, -9)$$



$$r = \sqrt{(2a-11)^2 + (a-7+9)^2}$$

$$= \sqrt{(2a-11)^2 + (a+2)^2} = 5\sqrt{2}$$

S.O.B.S

$$\Rightarrow (2a-11)^2 + (a+2)^2 = 50$$

$$\Rightarrow 4a^2 - 44a + 121 + a^2 + 4a + 4 - 50 = 0$$

$$\Rightarrow 5a^2 - 40a + 75 = 0$$

$$\Rightarrow a^2 - 8a + 15 = 0$$

$$\Rightarrow (a-3)(a-5) = 0$$

$$\Rightarrow a = 3, 5$$

Ans: 5

a) $X(x, 0), A(5, 9), B(-4, 6)$

(15)

$$XA = XB$$

$$\Rightarrow XA^2 = XB^2$$

$$\Rightarrow (x-5)^2 + (0-9)^2 = (x+4)^2 + (0-6)^2$$

$$\Rightarrow \cancel{x^2} - 10x + 25 + 81 = \cancel{x^2} + 8x + 16 + 36$$

$$\Rightarrow 18x - 54 = 0$$

$$\Rightarrow x = 3 \quad \therefore (3, 0)$$

b) $Y(0, y), A(2, 3), B(-4, 1)$

$$YA = YB$$

$$\Rightarrow YA^2 = YB^2 =$$

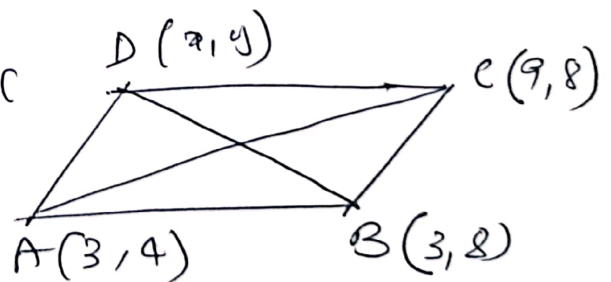
$$\Rightarrow (0-2)^2 + (y-3)^2 = (0+4)^2 + (y-1)^2$$

$$\Rightarrow 4 + \cancel{y^2} - 6y + 9 = 16 + \cancel{y^2} - 2y + 1$$

$$\Rightarrow 4y - 4 = 0 \Rightarrow y = 1 \quad \therefore (0, 1)$$

c) mid-point BD = mid-point of AC

$$\left(\frac{x+3}{2}, \frac{y+8}{2}\right) = \left(\frac{3+9}{2}, \frac{4+8}{2}\right)$$



$$\Rightarrow (x, y) = (9, 4)$$

d) $PA^2 = PB^2$

$$\Rightarrow (3-0)^2 + (k-2)^2 = (k-0)^2 + (5-2)^2$$

$$\Rightarrow \cancel{9} + \cancel{k^2} - 4k + 4 = \cancel{k^2} + 9$$

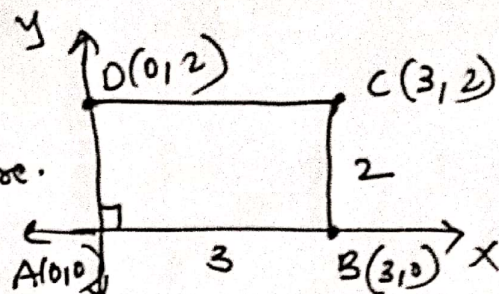
$$\Rightarrow k = 1$$

$\Rightarrow$ THE END $\Rightarrow$ Ans: S, P, Q, T

Teaching Task

15 Assertion:

Clearly ABCD is not a square.
(False)



Reason: Conceptual (True)

Ans: D

16. Assertion:

$$PQ = \sqrt{(0-0)^2 + (2+3)^2} = 5 \text{ (False)}$$

Reason: Conceptual (True)

Ans: D

19. $AB = \sqrt{4^2 + 0^2} = 4$, $BC = \sqrt{(4-4)^2 + (3-0)^2} = 3$
Ans: B

20. $AC = \sqrt{4^2 + 3^2} = \sqrt{16+9} = 5$
 $BD = \sqrt{(4-0)^2 + (0-3)^2} = \sqrt{16+9} = 5$
 $\therefore AC = BD$
Ans: B

22. A(1,2), B(4,5), C(K,8)
A, B, C are collinear
 $\Rightarrow$ Slope of AB = slope of BC
 $\Rightarrow \frac{5-2}{4-1} = \frac{8-5}{K-4} \Rightarrow K=7$
Ans: 7

24. a) clearly (1,1), (3,3), (5,5) collinear (P)
b) clearly (0,0), (2,4), (4,8) are not collinear (Q)
c) $MN = \sqrt{(2+2)^2 + (5-1)^2} = \sqrt{16+16} = \sqrt{32}$ (R)
d) $PQ = \sqrt{3^2 + 4^2} = \sqrt{16+9} = \sqrt{25} = 5$ (S)
Ans: P, Q, R, S

LEARNERS PAGE (JEE MAINS LEVEL)

12. A) True ✓

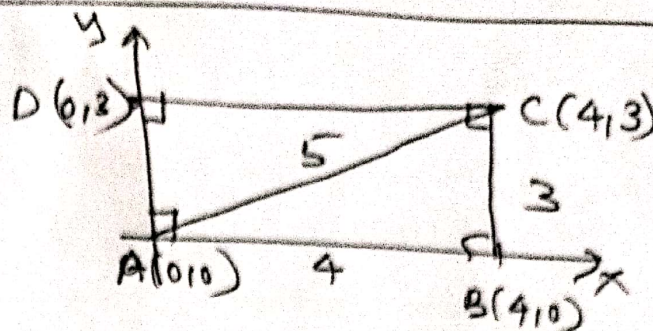
B) $AB = 4, BC = 3$

$$AC^2 = 4^2 + 3^2 = 16 + 9 = 25$$

$$\therefore AC = 5$$

$$\text{Also } BD = 5 \quad \checkmark$$

C) ABCD is a rectangle ✓



Ans. A, B, C

13. Statement I: Mathematically (True)

Statement II: Mathematically (True)

Ans. A

15. Assertion: $AC = \sqrt{(4-1)^2 + (5-1)^2} = \sqrt{9+16} = 5$

$$BD = \sqrt{(1-4)^2 + (5-1)^2} = \sqrt{9+16} = 5$$

$$\therefore AC = BD \text{ (True)}$$

Reason: Conceptual (True)

Ans. A

16. Assertion: $AB = \sqrt{(2+1)^2 + (3+1)^2} = \sqrt{9+16} = 5 \text{ (False)}$

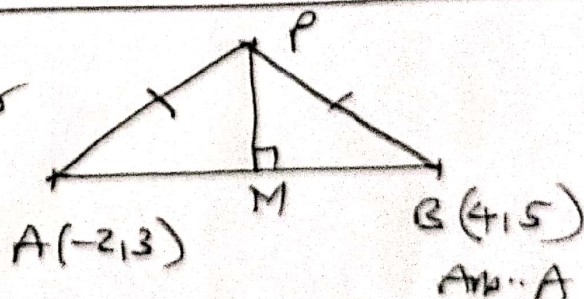
Reason: Conceptual (True)

Ans. D

18. $PA = PB$

$\Rightarrow M$ is the foot of the $\perp$

$$\therefore M = \left(\frac{-2+4}{2}, \frac{3+5}{2} \right) = (1, 4)$$



Ans. A

19. $P(1,2), Q(3,4), R(5,6)$

We have $PQ = 2\sqrt{2}$ $QR = 2\sqrt{2}$ $PR = 4\sqrt{2}$

Clearly $PQ + QR = PR$

$\Rightarrow P, Q, R$ are collinear

Ans. B

20. P, Q, R are collinear Ans: B

22. $AB = \sqrt{(0+4)^2 + (3-0)^2} = \sqrt{16+9} = \sqrt{25} = 5$
Ans: 5

24 A) A(0,0), B(4,0), C(4,3), D(0,3)

Diagonal AC = $\sqrt{4^2 + 3^2} = \sqrt{16+9} = \sqrt{25} = 5$

Similarly BD = 5 (P)

B) $AB = \sqrt{(4-1)^2 + (1-1)^2} = 3$ (Q)

C) A(0,0), B(2,3), C(5,3), D(3,0)

clearly sides unequal, diagonals unequal (R)

D) ~~80~~ A(0,0), B(3,0), C(4,2), D(1,2)

$AB = \sqrt{3^2 + 0^2} = 3$, $BC = \sqrt{(4-3)^2 + (2-0)^2}$
 $= \sqrt{1+4} = \sqrt{5}$ (S)

Ans: P, Q, R, S

$\Rightarrow$ THE END $\Leftarrow$