

8) $P(2, -3), Q(10, y)$

$$PQ = 10$$

$$\Rightarrow PQ^2 = 10^2$$

$$(10-2)^2 + (y+3)^2 = 100$$

$$\Rightarrow 8^2 + y^2 + 9 + 6y = 100$$

$$\Rightarrow y^2 + 6y + 9 + 64 - 100 = 0$$

$$\Rightarrow y^2 + 6y - 27 = 0$$

$$\Rightarrow (y+9)(y-3) = 0$$

$$\Rightarrow y+9=0, y-3=0$$

$$\Rightarrow y = -9, y = 3$$

$$\therefore y = -9, 3$$

$$x = 4$$

$$QR = \sqrt{(4-0)^2 + (6-1)^2}$$

$$= \sqrt{16+25}$$

$$= \sqrt{41}$$

$$x = -4$$

$$QR = \sqrt{(-4-0)^2 + (6-1)^2}$$

$$= \sqrt{16+25}$$

$$= \sqrt{41}$$

$$x = 4$$

$$PR = \sqrt{(4-5)^2 + (6+3)^2}$$

$$= \sqrt{(-1)^2 + 9^2}$$

$$= \sqrt{1+81}$$

$$= \sqrt{82}$$

$$x = -4$$

$$PR = \sqrt{(-4-5)^2 + (6+3)^2}$$

$$= \sqrt{81+81}$$

$$= \sqrt{162}$$

$$= \sqrt{9 \times 9 \times 2}$$

$$= 9\sqrt{2}$$

9) $Q(0, 1), P(5, -3), R(x, 6)$

$$QP = QR$$

$$\Rightarrow QP^2 = QR^2$$

$$(5-0)^2 + (-3-1)^2$$

$$= (x-0)^2 + (6-1)^2$$

$$\Rightarrow 25 + 16 = x^2 + 25$$

$$\Rightarrow x = \pm 4$$

$$QP = \sqrt{(5-0)^2 + (-3-1)^2}$$

$$= \sqrt{25+16}$$

$$= \sqrt{41}$$

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

$$PA = PB$$

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

$$(3-x)^2 + (6-y)^2$$

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

$$\Rightarrow 9 + x^2 - 6x + 36 + y^2 - 12y = 9 + x^2 + 6x + 16 + y^2 - 8y$$

$$\Rightarrow 45 - 6x - 12y = 25 + 6x - 8y$$

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

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