

Topic 26: Coordinate Geometry

- 1a) Since M is the mid-pt of PR, the coordinates of M are (0, 2)

The coordinates of P are (2, 0)

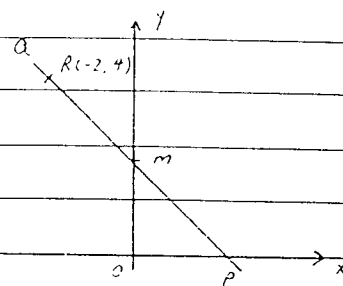
- b) Q(t, 5)

$$\frac{5-4}{t-2} = \frac{4}{-2-2}$$

$$\frac{1}{t-2} = -1$$

$$t-2 = -1$$

$$t = -3$$



- 2a) $5x + 3y - 1 = 0$ (line l)

$$3y = -5x + 1$$

$$y = -\frac{5}{3}x + \frac{1}{3}$$

- b) Since $l' \parallel l$, gradient of $l' = -\frac{5}{3}$.

$$\text{Eqn. of } l' \text{ is } y = -\frac{5}{3}x + c$$

$$Pt(0, -1) \Rightarrow -1 = c$$

$$\therefore \text{Eqn. of } l' \text{ is } y = -\frac{5}{3}x - 1$$

- 3a) Gradient of AB = $\frac{12-4}{7-1}$

$$= \frac{4}{3}$$

$$= 1\frac{1}{3}$$

- b) Eqn. of AB is $y = \frac{4}{3}x + c$.

$$A(1, 4) \Rightarrow 4 = \frac{4}{3} + c$$

$$c = 2\frac{2}{3}$$

$$\therefore \text{Eqn. of AB is } y = \frac{4}{3}x + 2\frac{2}{3}$$

- c) Length of AB = $\sqrt{(7-1)^2 + (12-4)^2}$

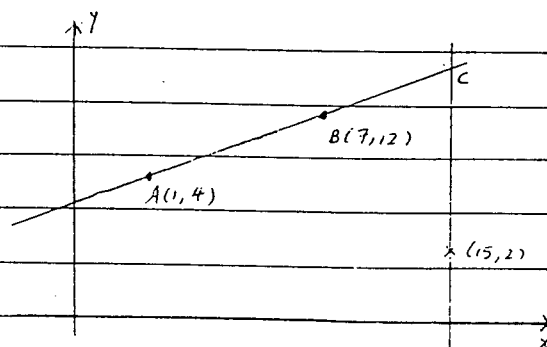
$$= 10 \text{ units}$$

- d) Eqn. of AB is $y = \frac{4}{3}x + 2\frac{2}{3}$

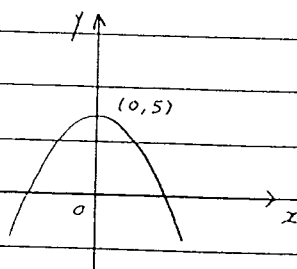
$$\text{When } x = 15, y = \frac{4}{3}(15) + 2\frac{2}{3}$$

$$= 22\frac{2}{3}$$

$\therefore$ The coordinates of C are (15, $22\frac{2}{3}$).



4a Graph the graph of $y = 5 - x^2$



b

$$9 - 3p + pq - 3q$$

$$= 3(3 - p) - q(3 - p)$$

$$= (3 - q)(3 - p)$$

5a $3x + 4y + 12 = 0$

$$4y = -3x - 12$$

$$y = -\frac{3}{4}x - 3$$

$\therefore$ Gradient is $-\frac{3}{4}$.

b When $x = 0$, $y = -3$ When $y = 0$, $-\frac{3}{4}x = 3$

$$\therefore B(0, -3)$$

$$x = -4$$

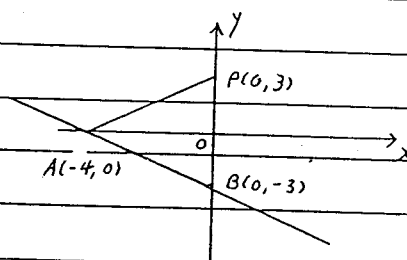
$$\therefore A(-4, 0)$$

c Length of $AB = \sqrt{(-4)^2 + 3^2}$

$$= 5 \text{ units}$$

d Area of $\triangle PAB = \frac{1}{2} \times 6 \times 4$

$$= 12 \text{ units}^2$$



6a $3x + 4y = 24$

$$4y = -3x + 24$$

$$y = -\frac{3}{4}x + 6$$

Gradient of the line is $-\frac{3}{4}$.

b When $x = 0$, $y = 6$ When $y = 0$, $\frac{3}{4}x = 6$

$$x = 8$$

$$\therefore B(0, 6) \text{ and } A(8, 0)$$

c Length of $AB = \sqrt{36 + 64}$

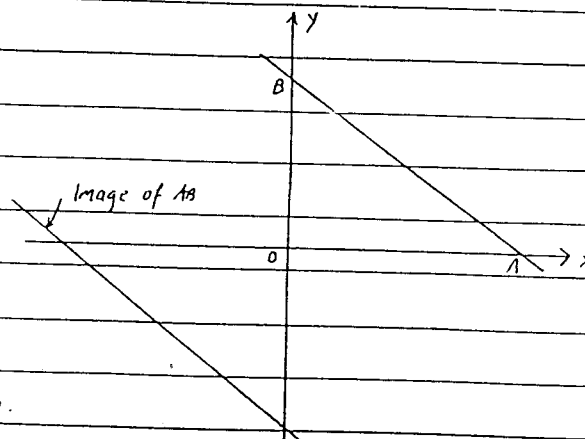
$$= 10 \text{ units}$$

d Coordinates of C are $(-8, 0)$.

e AB undergoes a 180° rotation about $(0, 0)$.

Gradient of image of line $AB = -\frac{3}{4}$. The y -intercept is -6 . $\therefore$ Eqn of image of AB is

$$y = -\frac{3}{4}x - 6$$



7(a) $x + 3y = 6$

When $x = 0$, $y = 2$ When $y = 0$, $x = 6$

$\therefore P(6, 0)$ and $Q(0, 2)$

8(a) $R(x, 5)$

(a) When $y = 5$, $x + 15 = 6$

$x = -9$

$\therefore R(-9, 5)$

16) Area of $\Delta PQR = \frac{1}{2} \times 6 \times 5$ OR

$= \frac{1}{2} (6)(5)$

$= 15 \text{ units}^2$