

$$a) y = x^2 + 3x$$

$$\frac{dy}{dx} = 2x + 3 \quad \text{sub in } x = 1$$

$$= 2 + 3$$

$$= 5$$

$$m = 5$$

$$\text{sub in } m = 5, y = 4, x = 1$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 5(x - 1)$$

$$y - 4 = 5x - 5$$

$$y = 5x - 1$$

$$b) i) m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{3 - 5}{4 + 2}$$

$$= -\frac{2}{6}$$

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

$$\text{subs in } m = -\frac{1}{3}, x = 4, y = 3$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -\frac{1}{3}(x - 4)$$

$$y - 3 = -\frac{1}{3}x + \frac{4}{3} \quad (+3)$$

$$y = -\frac{1}{3}x + 4\frac{1}{3}$$

$$\frac{1}{3}x + y - 4\frac{1}{3} = 0 \quad (\times 3)$$

$$\text{Eqn } x + 3y - 13 = 0$$

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

$$\text{subs in } A(-2, 5) \quad B(4, 3)$$

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

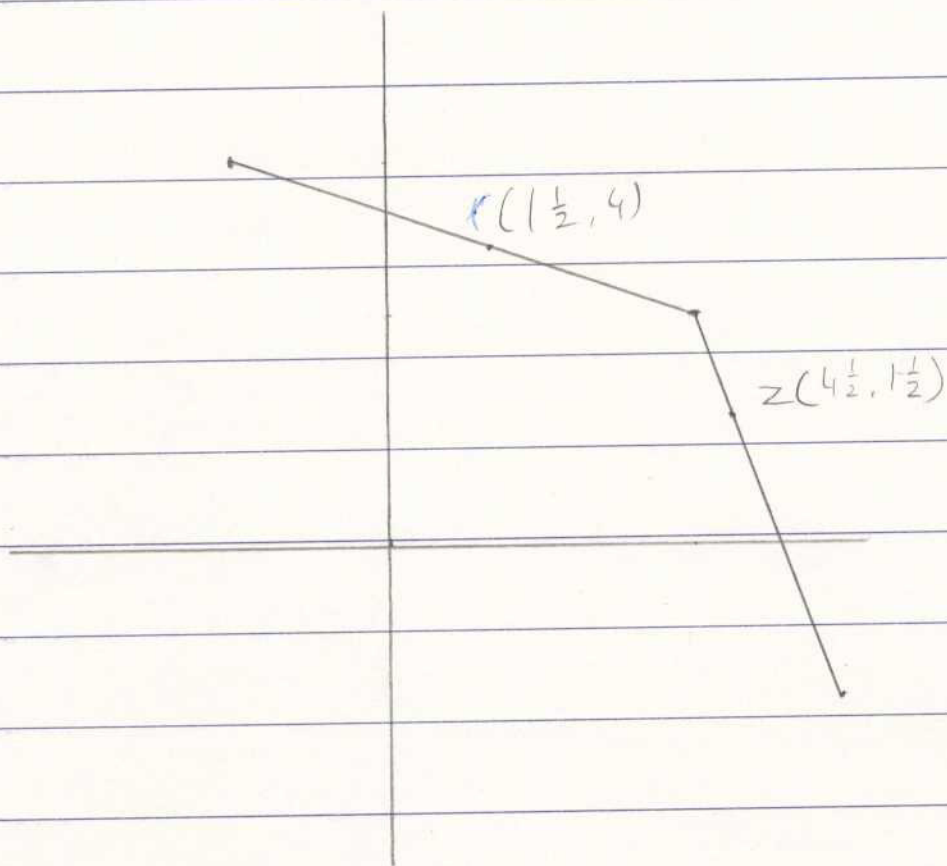
$$= \sqrt{36 + 4}$$

$$= \sqrt{40}$$

$$= \sqrt{4 \times 10}$$

$$= 2\sqrt{10} \text{ units}$$

iii)



perpendicular distance from O to AB = length of OX

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

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

$$= \sqrt{18\frac{1}{2}} \text{ units.}$$

iv) $A = l \times h$

$$= 2\sqrt{10} \times \sqrt{18\frac{1}{2}}$$

$$= 27.202941 \dots$$

$$= 27.2 \text{ units}^2 \text{ (1 dec. pl.)}$$

v). C is at point $(6, -2)$

perpendicular distance of O to AB = length of OZ

Z $(4\frac{1}{2}, 1\frac{1}{2})$

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

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

$$= \sqrt{22\frac{1}{2}} \text{ units}$$