



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

$$\frac{dy}{dx} = 2x + 3$$

$$= 2(1) + 3$$

$$= 5$$

\therefore gradient at $(1, 4) = 5$

$$\frac{y-4}{x-1} = 5$$

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

$$y = 5x - 1 + 4$$

$$y = 5x + 3$$

$$b) \quad i) \quad \frac{y-5}{x+2} = \frac{3-5}{4+2}$$

$$\frac{y-5}{x+2} = \frac{-2}{6}$$

$$y-5 = -\frac{1}{3}(x+2)$$

$$y = -\frac{1}{3}x + -\frac{2}{3} + 5$$

$$\frac{1}{3}x - y + 4\frac{1}{3} = 0$$



$$\text{ii) } x = \frac{4+2}{2} \quad y = \frac{3+5}{2}$$

~~1, 4~~

$$(1, 4)$$

$$\text{iii) } d = \frac{|ax+by+c|}{\sqrt{a^2+b^2}}$$

$$d = \frac{|x+3y-13|}{\sqrt{10}}$$

$$d = \frac{|x+3y-13|}{\sqrt{10}} \times \frac{\sqrt{10}}{\sqrt{10}}$$

$$d = \frac{\sqrt{10}|x+3y-13|}{10}$$

$$d = \frac{2\sqrt{10} + 3y\sqrt{10} - 13\sqrt{10}}{10}$$

iv) points in parallelogram OABC are: $(0,0), (-2,5), (4,3), (6,-2)$

v) equation of BC

$$\frac{y-3}{x-4} = \frac{-2-3}{6-4}$$

$$\frac{y-3}{x-4} = \frac{-5}{2}$$

$$y-3 = -\frac{5}{2}(x-4)$$

$$y = -\frac{5}{2}x + 13$$

$$\frac{5}{2}x - y + 13 = 0$$

$$d = \frac{|-\frac{5}{2}x - y + 13|}{\sqrt{\frac{25}{4} + 1}}$$

$$d = \frac{|-\frac{5}{2}x - y + 13|}{\sqrt{6\frac{1}{4}}}$$