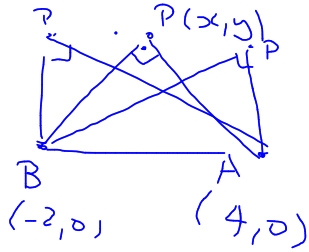
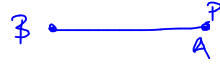


4b)

$$m_{AP} = \frac{y}{x-4}$$

$$m_{BP} = \frac{y}{x+2}$$



circle AB diameter

centre (1,0)

radius 3

$$\underline{(x-1)^2 + y^2 = 9}$$

$$m_{AP} \times m_{BP} = -1$$

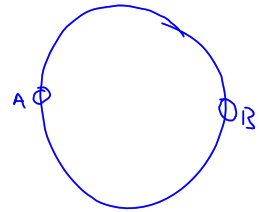
$$\frac{y}{x-4} \times \frac{y}{x+2} = -1$$

$$y^2 = -x^2 + 2x + 8$$

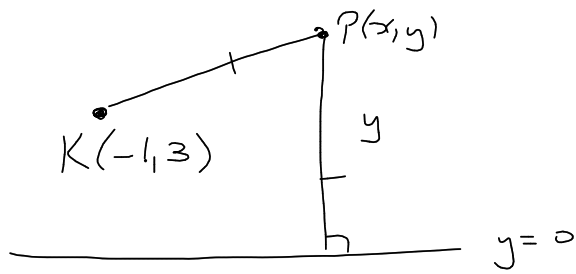
$$x^2 - 2x + y^2 = 8$$

$$\underline{(x-1)^2 + y^2 = 9}$$

excluding A and B



6/



$$\sqrt{(x+1)^2 + (y-3)^2} = y$$
$$x^2 + 2x + 1 + y^2 - 6y + 9 = y^2$$

$$6y = x^2 + 2x + 10$$

$$y = \frac{1}{6}(x^2 + 2x + 10)$$

8/ $P(x, y)$ $A(1, 1)$ $B(-1, 1)$ $C(1, -1)$ $D(-1, -1)$

$$AP^2 + PB^2 + PC^2 + PD^2 = 12$$

$$(x-1)^2 + (y-1)^2 + (x+1)^2 + (y-1)^2 + (x-1)^2 + (y+1)^2 + (x+1)^2 + (y+1)^2 = 12$$

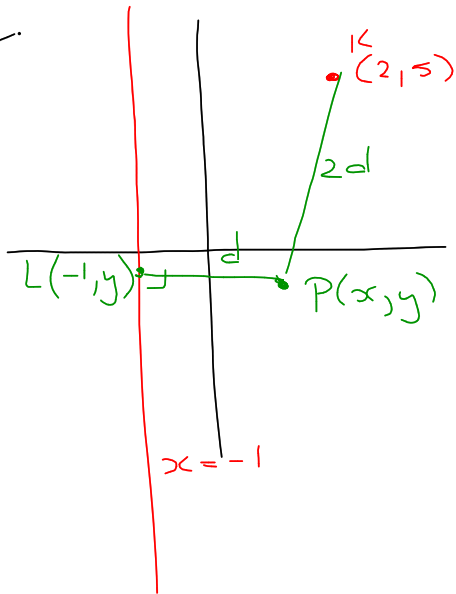
$$2x^2 + 2 + 2y^2 + 2 + 2x^2 + 2 + 2y^2 + 2 = 12$$

$$4x^2 + 4y^2 = 4$$

$$\underline{x^2 + y^2 = 1}$$

locus is a circle, centre $(0, 0)$ radius 1 unit.

10.



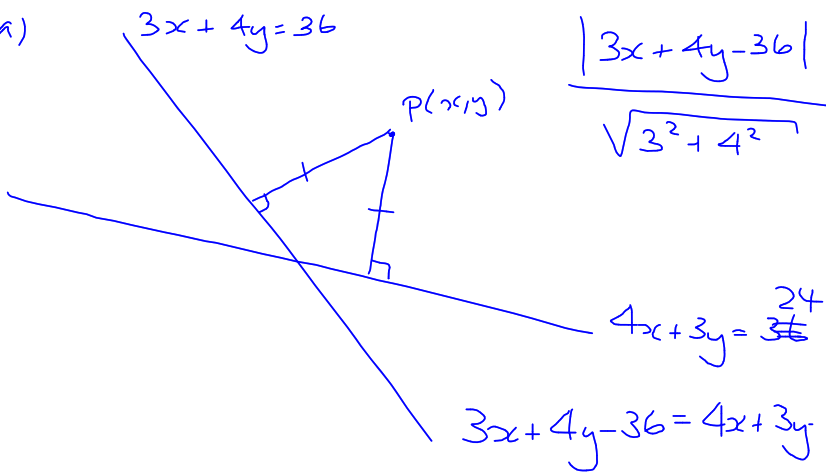
$$PK = 2PL$$

$$\sqrt{(x-2)^2 + (y-5)^2} = 2(x+1)$$

$$x^2 - 4x + 4 + y^2 - 10y + 25 = 4x^2 + 8x + 4$$

$$3x^2 + 12x - y^2 + 10y = 25$$

11a)



$$\frac{|3x + 4y - 36|}{\sqrt{3^2 + 4^2}} = \frac{|4x + 3y - 24|}{\sqrt{3^2 + 4^2}}$$

$$|3x + 4y - 36| = |4x + 3y - 24|$$

$$3x + 4y - 36 = 4x + 3y - 24 \quad \text{or} \quad -3x - 4y + 36 = 4x + 3y - 24$$

$$\underline{x - y + 12 = 0}$$

$$m_1 = 1$$

$$\underline{7x + 7y - 60 = 0}$$

$$m_2 = -1$$

$$m_1 \times m_2 = -1$$

\therefore lines are \perp

13/

$$P(x, y) \text{ on the line } y = 4x + 3$$
$$= P(x, 4x + 3)$$

$$M_{\text{op}} = \left(\frac{x+0}{2}, \frac{4x+3+0}{2} \right)$$

$$= \left(\frac{1}{2}x, \frac{1}{2}(4x+3) \right)$$

$$X = \frac{1}{2}x$$

$$x = 2X$$

$$Y = \frac{1}{2}(4x+3)$$

$$= \frac{1}{2}(4(2X) + 3)$$

$$Y = 4X + \frac{3}{2}$$

$$\underline{\underline{Y = 4X + \frac{3}{2}}}$$

14

$$2x - 3y + 6 = 0 \Rightarrow y = -\frac{2}{3}x + 2$$

$$P(x, \frac{2}{3}x + 2)$$

$$O(0,0) \quad \times \quad P(x, \frac{2}{3}x + 2)$$

3:2

$$Q \left(\frac{3x}{5}, \frac{2x+6}{5} \right)$$
$$= \left(\frac{3}{5}x, \frac{2}{5}(x+3) \right)$$

$$X = \frac{3}{5}x$$

$$x = \frac{5}{3}X$$

$$Y = \frac{2}{5}(x+3)$$

$$Y = \frac{2}{5}\left(\frac{5}{3}X + 3\right)$$

$$\underline{Y = \frac{2}{3}X + \frac{6}{5}}$$