5e) $y = -x^2 + 2x + 3$

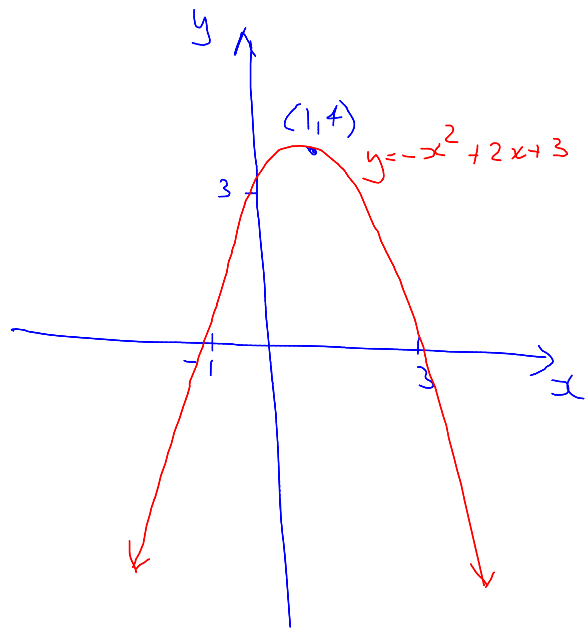
$= -(x^2 - 2x - 3)$

$= -(x-3)(x+1)$

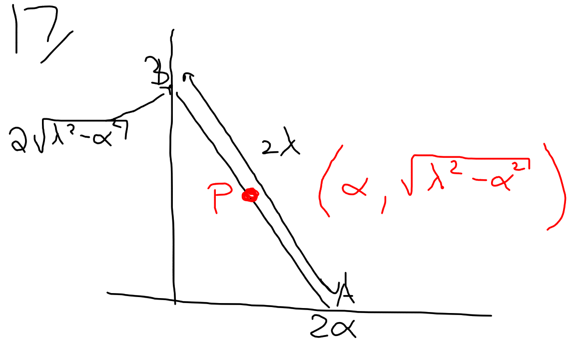
<u>x int</u>: $(-1, 0)$ $(3, 0)$

<u>y int</u>: $(0, 3)$

<u>Vertex</u>: $(1, 4)$



17/



$x = \alpha \qquad y = \sqrt{\lambda^2 - \alpha^2}$

$$= \sqrt{\lambda^2 - x^2}$$

$$y^2 = \lambda^2 - x^2$$

$$\underline{x^2 + y^2 = \lambda^2}.$$

$$\underline{\text{radius} = \lambda \text{ units}}$$

$$d^2 = (2\lambda)^2 - (2\alpha)^2$$

$$= 4\lambda^2 - 4\alpha^2$$

$$d = 2\sqrt{\lambda^2 - \alpha^2}$$

$$\therefore \underline{B\left(0, 2\sqrt{\lambda^2 - \alpha^2}\right)}.$$

ALTERNATIVE

Show $x^2 + y^2 = r^2$

$$x^2 + y^2 = \alpha^2 + \left(\sqrt{\lambda^2 - \alpha^2}\right)^2$$

$$= \alpha^2 + \lambda^2 - \alpha^2$$

$$= \lambda^2$$

$$M = \left(\frac{2\alpha + 0}{2}, \frac{2\sqrt{\lambda^2 - \alpha^2} + 0}{2}\right)$$

$$= \underline{\left(\alpha, \sqrt{\lambda^2 - \alpha^2}\right)}.$$

$\therefore$ M lies on circle $x^2 + y^2 = \lambda^2$, radius $= \lambda$

$$2^x \doteq \frac{1}{4}x^2 + \frac{3}{4}x + 1$$

$$\sqrt{2} = 2^{\frac{1}{2}} \doteq \frac{1}{4}\left(\frac{1}{4}\right) + \frac{3}{4}\left(\frac{1}{2}\right) + 1$$

$$= \frac{1}{16} + \frac{3}{8} + 1$$

$$= 1\frac{7}{16} \doteq 1.4375$$