6 d) $y = a(x-2)(x-8)$

coefficient of x^2 is 3

$\underline{\underline{a = 3}}$

6e)

$$y = a(x-2)(x-8)$$

$$(5,-12): \quad -12 = a(3)(-3)$$

$$9a = 12$$

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

7d)

$y = (x-1)(x-\alpha)$

curve passes through $(3, 9)$

$9 = 2(3-\alpha)$

$9 = 6 - 2\alpha$

$-2\alpha = 3$

$\alpha = \frac{-3}{2}$

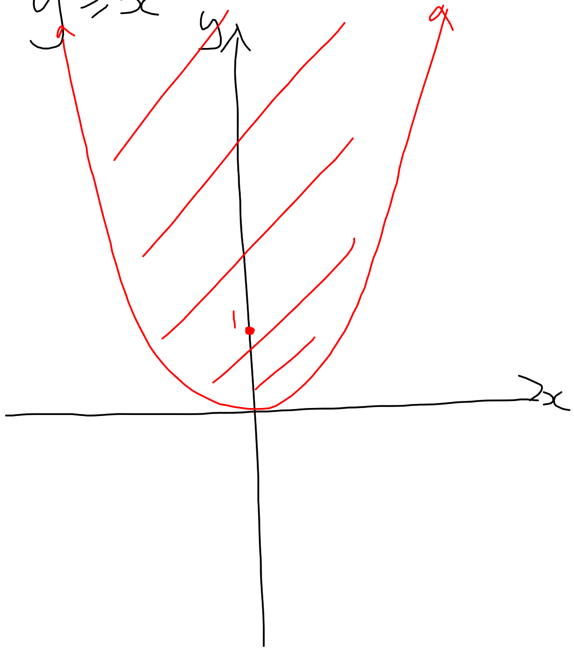
$y = (x-1)(x+\frac{3}{2})$

9a)

$y \geq x^2$

$(0,1)$

$1 \geq 0^2$ ✓



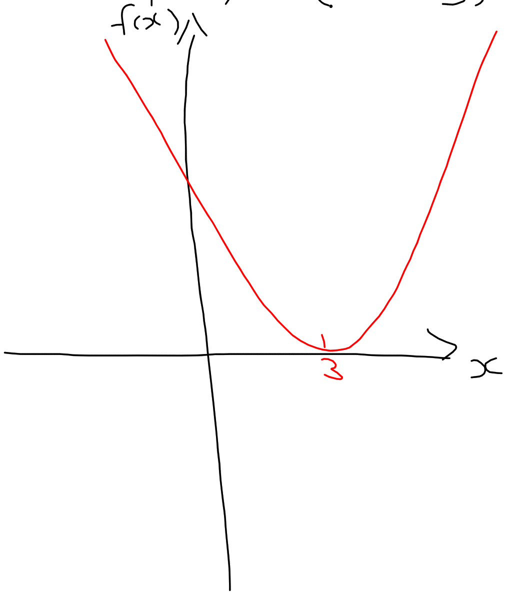
13b) $y = x^2 + (1-a^2)x - a^2$

$X = -a^2$

$+ = 1-a^2$

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

14a) (i) $f(x) = (x-3)^2$



(ii) $f'(x) = 2(x-3)'(1)$

$= 2(x-3)$

$f(3) = (3-3)^2 = 0$

$f'(3) = 2(3-3) = 0$

$\therefore f(3) = f'(3) = 0$

$\therefore$ x axis is a tangent.

16/ $y = x^4 - 13x^2 + 36$

$$f(-x) = (-x)^4 - 13(-x)^2 + 36$$
$$= x^4 - 13x^2 + 36$$
$$= f(x)$$

$\therefore$ even function

18/

$$f(x) = k(x-\alpha)(x-\beta)$$

a) $$f\left(\tfrac{1}{2}(\alpha+\beta)+h\right) = k\left[\tfrac{1}{2}(\alpha+\beta)+h-\alpha\right]\left[\tfrac{1}{2}(\alpha+\beta)+h-\beta\right]$$

$$= k\left(\frac{\beta-\alpha}{2}+h\right)\left(\frac{\alpha-\beta}{2}+h\right)$$

$$f\left(\tfrac{1}{2}(\alpha+\beta)-h\right) = k\left[\tfrac{1}{2}(\alpha+\beta)-h-\alpha\right]\left[\tfrac{1}{2}(\alpha+\beta-h)-\beta\right]$$

$$= k\left(\frac{\beta-\alpha}{2}-h\right)\left(\frac{\alpha-\beta}{2}-h\right)$$

$$= k\left(\frac{\alpha-\beta}{2}+h\right)\left(\frac{\beta-\alpha}{2}+h\right)$$

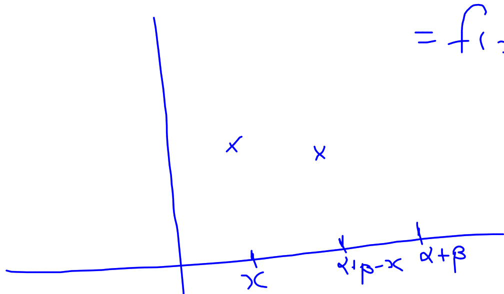
$$= f\left(\tfrac{1}{2}(\alpha+\beta)+h\right)$$

b) $f(\alpha+\beta-x) = k[(\alpha+\beta-x-\alpha)(\alpha+\beta-x-\beta)]$

$$= k(\beta-x)(\alpha-x)$$

$$= k(x-\beta)(x-\alpha)$$

$$= f(x)$$



$$x = \alpha+\beta-x$$

$$x = \frac{\alpha+\beta}{2}$$