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(47) a)  $f(x) = x^2 - 2x - 3$

Vertice:  $V(x_v; y_v)$

$x_v = \frac{-b}{2a} \rightarrow \frac{-(-2)}{2 \cdot 1} = 1$

$y_v = f(x_v) \rightarrow 1^2 - 2 \cdot 1 - 3 = -4 \quad V = (1; -4)$

b)  $f(x) = -x^2 + 3x - 5$

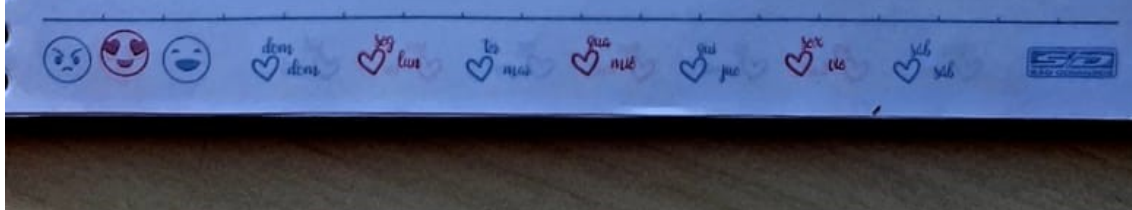
$x_v = \frac{-b}{2a} \rightarrow \frac{-3}{2 \cdot (-1)} = \frac{-3}{-2} = 1,5$

$y_v = f(x_v) \rightarrow -1,5^2 + 3 \cdot 1,5 - 5 = -2,75$

c)  $f(x) = x^2 - 4x + 3$

$x_v = \frac{-b}{2a} \rightarrow \frac{-(-4)}{2 \cdot 1} = 2$

$y_v = f(x_v) \rightarrow 2^2 - 4 \cdot 2 + 3 = -1 \quad V(2; -1)$



d)  $y = x^2$   
 $x=0 \quad (0;0)$

e)  $y = (x-2)^2 + 3$   
 $y = x^2 - 4x + 4$

$x_v = \frac{-b}{2a} \rightarrow \frac{-(-4)}{2 \cdot 1} = 2$

$y_v = f(x_v) \rightarrow 2^2 - 4 \cdot 2 + 4 = 0 \quad V = (2; 0)$

53) a)  $C = x^2 - 80x + 3000$

$x_v = \frac{-b}{2a} \rightarrow \frac{-(-80)}{2} = 40 \text{ unidades}$

b)  $y_v = f(x_v) \rightarrow 40^2 - 80 \cdot 40 + 3000 = 1400$

55) DESAFIO!

$f(x) = x^2 - 4x + 7 \quad f: A \rightarrow [3; 7]$

$x_v = \frac{-b}{2a} \rightarrow \frac{-(-4)}{2 \cdot 1} = 2$

$y_v = f(x_v) \rightarrow 2^2 - 4 \cdot 2 + 7 = 3$

$3 < 7 \rightarrow 7 - 3 = 4 \rightarrow 4^2 - 4 \cdot 4 + 7 = 7$

57)  $f(x) = -x^2 + Bx - 156$   $8 < x < 20$

$$-12^2 + 12B - 156 = 0$$

$$-144 - 156 = 12B$$

$$-300 = -12B$$

$$\frac{300}{12} = B$$

$$B = 25$$

$$-x^2 + 25x - 156 = 0$$

$$x^2 - 25x + 156 = 0$$

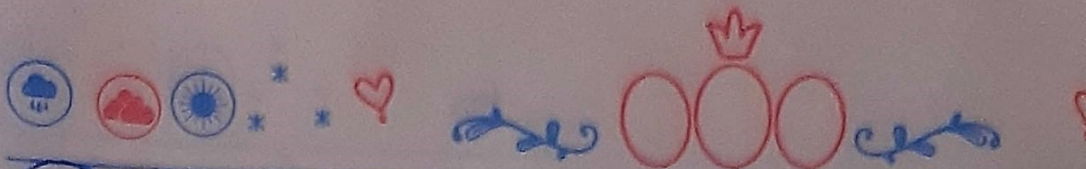
$$\frac{-b \pm \sqrt{b^2 - 4 \cdot a \cdot c}}{2 \cdot a} \rightarrow x_1 = \frac{-(-25) + \sqrt{(-25)^2 - 4 \cdot 1 \cdot 156}}{2 \cdot 1}$$

$$\frac{25 + \sqrt{625 - 624}}{2} = \frac{25 + 1}{2} = \underline{\underline{13}}$$

$$x_2 = \frac{-(-25) - \sqrt{(-25)^2 - 4 \cdot 1 \cdot 156}}{2 \cdot 1}$$

$$x_2 = \frac{25 - \sqrt{625 - 624}}{2} = \frac{25 - 1}{2} = \underline{\underline{12}}$$





(59)  $h(t) = 3t - 3t^2$

a)  $3t - 3t^2 = 0$

$$3t^2 = 3t$$

$$t = 1 \text{ segundo}$$

b)  $h(t) = 3 - 6t = 0$

$$t = 0,5 \text{ s}$$

$$h(0,5) = 3 \cdot 0,5 - 3 \cdot 0,5^2 = 0,75 \text{ metros}$$