

EXERCICIO M2BE3065:

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

$$g(x) = -x^2 + 2x + 4$$

a) Boceto:

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

Corte con los ejes:

$$\text{Eje } ox; y=0 \Rightarrow x^2 - 4x + 4 = 0$$

$$(x-2)^2 = 0 \Rightarrow x=2$$

Corte x

$$(2,0)$$

$$\text{Eje } oy; x=0 \Rightarrow y = 0^2 - 4 \cdot 0 + 4$$

$$y=4$$

Corte y

$$(0,4)$$

Vértice de la parábola: "U" (cóncava)

$$f'(x) = 2x - 4 \Rightarrow 2x - 4 = 0 \Rightarrow 2x = 4$$

$$x=2 \Rightarrow y=0$$

Vértice en (2,0)

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

Corte con los ejes:

$$\text{Eje } ox; y=0 \Rightarrow -x^2 + 2x + 4 = 0$$

$$x_1 = 1 - \sqrt{5} \approx -1,24$$

$$x_2 = 1 + \sqrt{5} \approx 3,24$$

Cortes x

$$(-1,24; 0)$$

$$(3,24; 0)$$

$$\text{Eje } oy; x=0 \Rightarrow y = -0^2 + 2 \cdot 0 + 4 = 4$$

$$(0,4)$$

Corte y

Vértice de la parábola: "∩" (cóncava)

$$g'(x) = -2x + 2 \Rightarrow -2x + 2 = 0 \Rightarrow x=1$$

$$g(1) = -1^2 + 2 \cdot 1 + 4 = 5$$

Vértice en (1,5)

Cortes entre sí, de $f(x)$ y $g(x)$:

$$\begin{aligned} f(x) &\rightarrow y = x^2 - 4x + 4 \\ g(x) &\rightarrow y = -x^2 + 2x + 4 \end{aligned} \left\{ \begin{aligned} x^2 - 4x + 4 &= -x^2 + 2x + 4 \\ 2x^2 - 6x &= 0 \end{aligned} \right.$$

$$2x(x-3) = 0 \begin{matrix} \nearrow x=0 \\ \searrow x=3 \end{matrix}$$

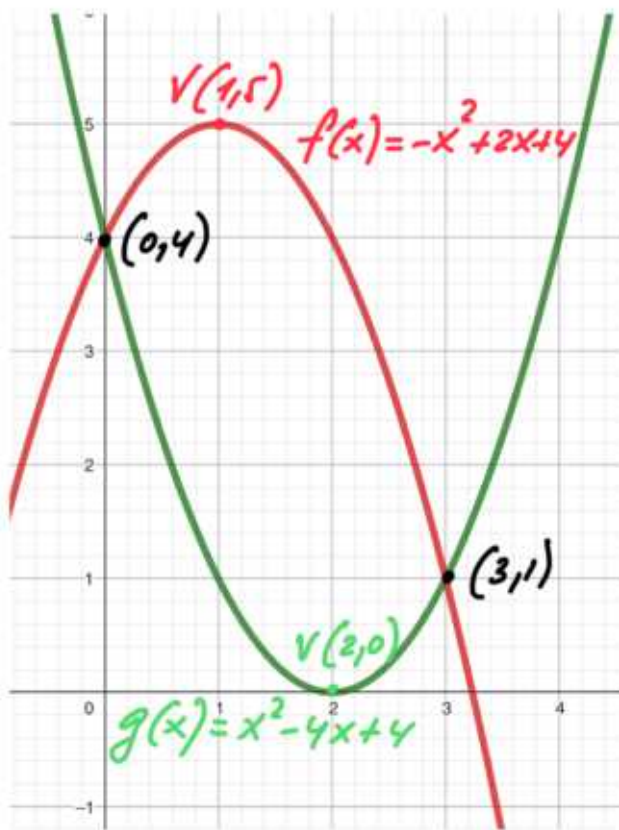
$$f(0) = 4$$

$$(0, 4)$$

$$f(3) = 3^2 - 4 \cdot 3 + 4 = 1$$

$$(3, 1)$$

a) Representación:



b) Área:

$$S_{\text{area}} = \int_0^3 [f(x) - g(x)] dx = \dots$$

$$-\underbrace{x^2 + 2x + 4}_{f(x)} - \underbrace{(x^2 - 4x + 4)}_{g(x)} = -2x^2 + 6x$$

$$\dots = \int_0^3 (-2x^2 + 6x) dx =$$

$$= \left[-\frac{2x^3}{3} + \frac{6x^2}{2} \right]_0^3 =$$

$$= -\frac{2 \cdot 3^3}{3} + \frac{6 \cdot 3^2}{2} = 9 \text{ u}^2$$

$$b.2) \quad 1 \text{ m}^2 \rightarrow 85 \text{ €}$$

$$9 \text{ m}^2 \rightarrow 85 \cdot 9 = 765 \text{ €}$$

$$765 - 750 = 15 \text{ € le faltan}$$