



Ejercicio 13

13 Calcula el área comprendida entre las curvas:

a) $y = x^2$; $y = x$

b) $y = x^2$; $y = 1$

c) $y = x^2$; $y = x^3$

d) $y = x^2$; $y = -x^2 + 2x$

e) $y = 2x^2 + 5x - 3$; $y = 3x + 1$

f) $y = 4 - x^2$; $y = 8 - 2x^2$; $x = -2$; $x = 2$

Resolución

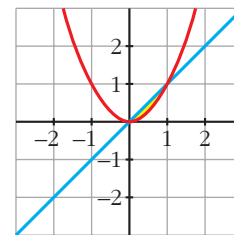
a) • Puntos de corte entre las curvas:

$$x^2 - x = 0 \rightarrow x_1 = 0, x_2 = 1$$

$$\bullet G(x) = \int (x^2 - x) dx = \frac{x^3}{3} - \frac{x^2}{2}$$

$$\bullet G(0) = 0; G(1) = -\frac{1}{6}$$

$$\bullet \text{Área} = |G(1) - G(0)| = \frac{1}{6} u^2$$



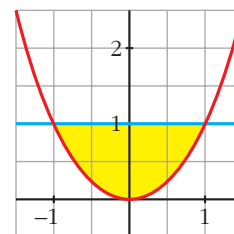
b) • Puntos de corte entre las curvas:

$$x^2 - 1 = 0 \rightarrow x_1 = -1, x_2 = 1$$

$$\bullet G(x) = \int (x^2 - 1) dx = \frac{x^3}{3} - x$$

$$\bullet G(-1) = \frac{2}{3}; G(1) = -\frac{2}{3}$$

$$\bullet \text{Área} = |G(1) - G(-1)| = \frac{4}{3} u^2$$



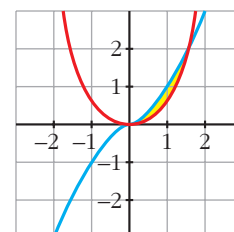
c) • Puntos de corte entre las curvas:

$$x^2 - x^3 = 0 \rightarrow x_1 = 0, x_2 = 1$$

$$\bullet G(x) = \int (x^2 - x^3) dx = \frac{x^3}{3} - \frac{x^4}{4}$$

$$\bullet G(0) = 0; G(1) = \frac{1}{12}$$

$$\bullet \text{Área} = |G(1) - G(0)| = \frac{1}{12} u^2$$





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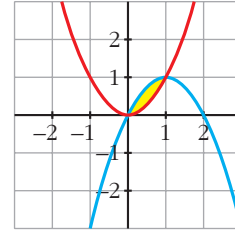
d) • Puntos de corte entre las curvas:

$$x^2 - (-x^2 + 2x) = 2x^2 - 2x = 0 \rightarrow x_1 = 0, x_2 = 1$$

$$\bullet G(x) = \int (2x^2 - 2x) dx = \frac{2x^3}{3} - x^2$$

$$\bullet G(0) = 0; G(1) = -\frac{1}{3}$$

$$\bullet \text{Área} = |G(1) - G(0)| = \frac{1}{3} u^2$$



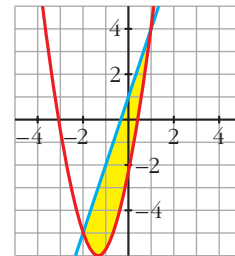
e) • Puntos de corte entre las curvas:

$$2x^2 + 5x - 3 - (3x + 1) = 2x^2 + 2x - 4 = 0 \rightarrow x_1 = -2, x_2 = 1$$

$$\bullet G(x) = \int (2x^2 + 2x - 4) dx = \frac{2x^3}{3} + x^2 - 4x$$

$$\bullet G(-2) = \frac{20}{3}; G(1) = -\frac{7}{3}$$

$$\bullet \text{Área} = |G(1) - G(-2)| = \left| -\frac{7}{3} - \frac{20}{3} \right| = \frac{27}{3} = 9 u^2$$



f) • Puntos de corte entre las curvas:

$$4 - x^2 - (8 - 2x^2) = x^2 - 4 = 0 \rightarrow x_1 = -2, x_2 = 2$$

$$\bullet G(x) = \int (x^2 - 4) dx = \frac{x^3}{3} - 4x$$

$$\bullet G(-2) = \frac{16}{3}; G(2) = -\frac{16}{3}$$

$$\bullet \text{Área} = |G(2) - G(-2)| = \frac{32}{3} u^2$$

