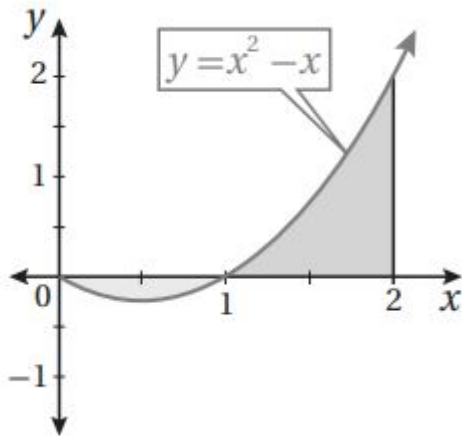


## إجابات كتاب التمارين

### المساحة

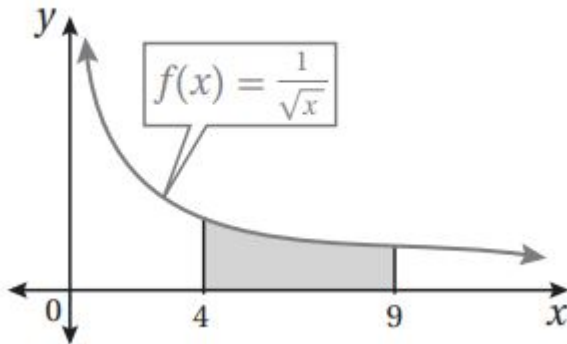
أجد مساحة المنطقة المظلمة في كل من التمثيلات البيانية الآتية:

1

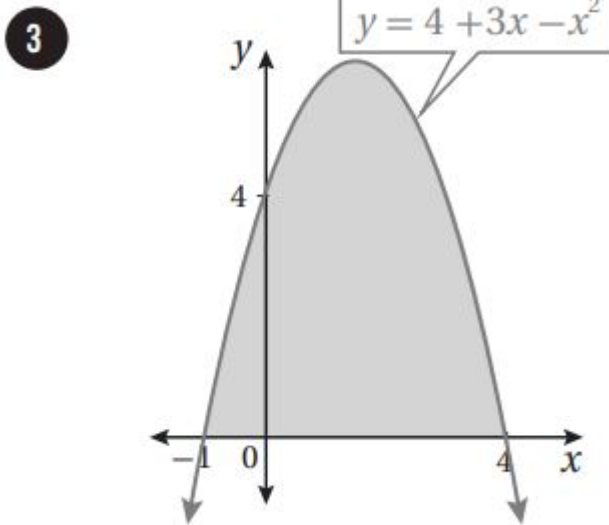


$$A = \int_0^1 (x - x^2) dx + \int_1^2 (x^2 - x) dx = (12x^2 - 13x^3) \Big|_0^1 + (13x^3 - 12x^2) \Big|_1^2 = (12 - 13) + (83 - 2) - (13 - 12) = 1$$

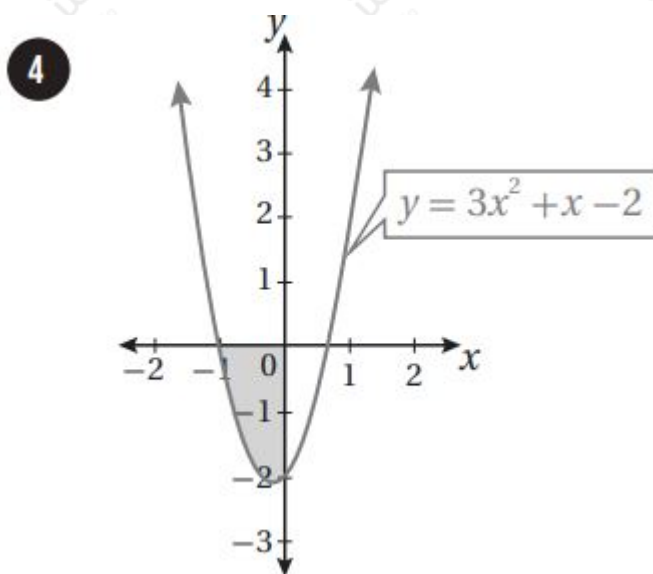
2



$$A = \int_4^9 \frac{1}{\sqrt{x}} dx = \int_4^9 x^{-1/2} dx = 2x^{1/2} \Big|_4^9 = 6 - 4 = 2$$

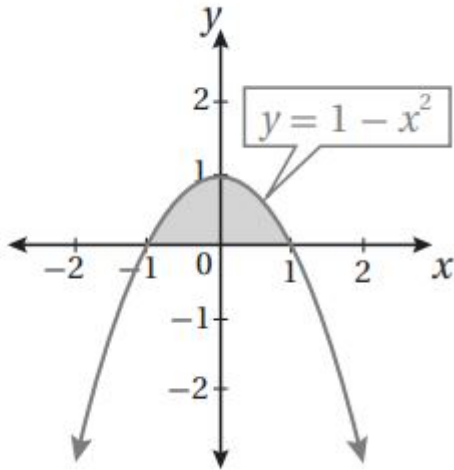


$$A = \int_{-1}^4 (4 + 3x - x^2) dx = (4x + \frac{3}{2}x^2 - \frac{1}{3}x^3) \Big|_{-1}^4 = (16 + 24 - \frac{64}{3}) - (-4 + \frac{3}{2} - \frac{1}{3}) = 12\frac{5}{6}$$



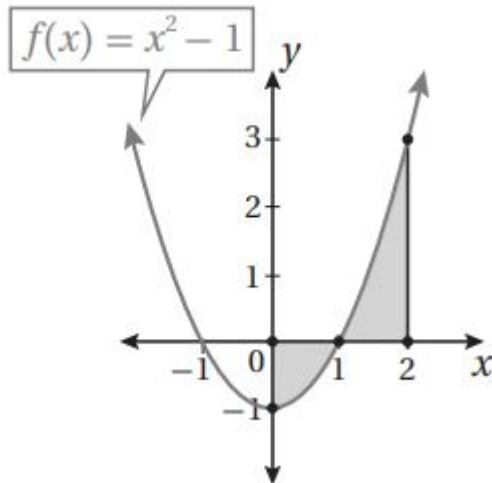
$$A = - \int_{-1}^1 (3x^2 + x - 2) dx = -(x^3 + \frac{1}{2}x^2 - 2x) \Big|_{-1}^1 = -((1 + \frac{1}{2} - 2) - (-1 + \frac{1}{2} - 2)) = 3$$

5



$$A = \int_{-1}^1 (1 - x^2) dx = (x - \frac{1}{3}x^3) \Big|_{-1}^1 = (1 - \frac{1}{3}) - (-1 + \frac{1}{3}) = \frac{4}{3}$$

6



$$A = \int_0^1 (1 - x^2) dx + \int_1^2 (x^2 - 1) dx = (x - \frac{1}{3}x^3) \Big|_0^1 + (\frac{1}{3}x^3 - x) \Big|_1^2 = 2$$

(7) أجد مساحة المنطقة المحصورة بين منحنى الاقتران:  $f(x) = 3x^2 - 3$ ، والمحور  $x$ .

$$3x^2 - 3 = 0 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$$

$$A = \int_{-1}^1 (3 - 3x^2) dx = (3x - x^3) \Big|_{-1}^1 = (3 - 1) - (-3 + 1) = 4$$

(8) أجد مساحة المنطقة المحصورة بين متحتى الاقتران:  $f(x) = x^3 - 5x^2 - 6x$  والمحور  $x$ .

$$x^3 - 5x^2 - 6x = 0 \Rightarrow x(x^2 - 5x - 6) = 0 \Rightarrow x(x - 6)(x + 1) = 0 \Rightarrow x = 0, x = 6, x = -1$$

$$A = \int_{-1}^0 (x^3 - 5x^2 - 6x) dx + \int_0^6 (-x^3 + 5x^2 + 6x) dx = (\frac{1}{4}x^4 - \frac{5}{3}x^3 - 3x^2) \Big|_{-1}^0 + (-\frac{1}{4}x^4 + \frac{5}{3}x^3 + 3x^2) \Big|_0^6 = (0) - (-\frac{1}{4} + 5 - 3) + (-\frac{3}{2} + 36 + 108) - (0) = 120$$

)=174112

(9) أجد مساحة المنطقة المحصورة بين منحنى الاقتران:  $f(x)=x^2(2-x)$ ، والمحور  $x$ .

$$x^2(2-x)=0 \Rightarrow x=0, x=2 \quad A = \int_0^2 x^2(2-x) dx = \int_0^2 (2x^2 - x^3) dx = (2 \cdot \frac{3}{2} x^3 - \frac{1}{4} x^4) \Big|_0^2 = (16 - 4) - (0) = 12$$