Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

- $\mathbf{-6}$
- $2(6) + 1(3) = \mathbf{15}$

2.2

- $\displaystyle\int_2^9 f = \int_2^6 f + \int_6^9 f$
- $\displaystyle\int_2^6 f = 10 - 3 = 7$
- $7 + (-4) = \mathbf{3}$

2.3

- split: $\displaystyle\int_{-2}^{2} 3\,dx + \int_{-2}^{2} \sqrt{4 - x^2}\,dx$
- rectangle $3 \times 4 = 12$
- semicircle $\frac{1}{2}\pi(2)^2 = 2\pi$; total $\mathbf{12} + \mathbf{2}\pi$

3.1

(a) $\frac{1}{2}(2)(2) - \frac{1}{2}(2)(2) - 2(2) = \mathbf{-4}$

(b) $2 + 2 + 4 = \mathbf{8}$

(c) $-(-4 + 6) = \mathbf{-2}$

3.2

(a) $7 - (-1) = \mathbf{8}$

(b) $2(7) + 3(4 - 1) = \mathbf{23}$

(c) $-\Big(\displaystyle\int_2^4 f\,dx - \int_2^4 x\,dx\Big) = -(8 - 6) = \mathbf{-2}$

(d) $7 + 3k = 1$, so $\mathbf{k = -2}$

3.3

(a) $3 + (-5) = \mathbf{-2}$; $\displaystyle\int_6^2 f = \mathbf{5}$

(b) $4(-2) - 3(6) = \mathbf{-26}$; $\displaystyle\int_2^6 x\,dx = \tfrac{2+6}{2} \times 4 = 16$; $-5 + 16 = \mathbf{11}$

(c) symmetry: $\displaystyle\int_{-6}^{0} f = \int_0^6 f$; $\displaystyle\int_{-6}^{6} f = 2(-2) = \mathbf{-4}$; $\displaystyle\int_{-2}^{6} f = \int_{-2}^{0} f + \int_0^6 f = 3 + (-2) = \mathbf{1}$

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(d) $g(0) = -\displaystyle\int_0^2 f = \mathbf{-3}$; $g(6) = \mathbf{-5}$; $g(-6) = -\displaystyle\int_{-6}^{2} f = -(-2 + 3) = \mathbf{-1}$; $-2 + 6k = 0$; $\mathbf{k = \frac{1}{3}}$