## Solutions

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

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

**2.1**

- $x^3 + 2x^{-2} + c$

**2.2**

- $\dfrac{(2x+1)^6}{6 \times 2}$
- $\dfrac{\mathbf{(2x+1)^6}}{\mathbf{12}} + \mathbf{c}$

**2.3**

- $\left[\frac{2}{3}x^{3/2}\right]_1^4$
- $\frac{2}{3}(8-1) = \mathbf{\frac{14}{3}}$

**2.4**

- $y = 2x^2 - x + c$
- $3 = 8 - 2 + c$, $c = -3$
- $\mathbf{y = 2x^2 - x - 3}$

**3.1**

- limits 0 and 4
- $\left[2x^2 - \frac{x^3}{3}\right]_0^4$
- $32 - \frac{64}{3} = \mathbf{\frac{32}{3}}$

**3.2**

- $[-3x^{-2}]_1^b = 3 - \dfrac{3}{b^2}$
- as $b \to \infty$, $\dfrac{3}{b^2} \to 0$: $\mathbf{3}$

**3.3**

(a) $4 - x^2 = x + 2 \Rightarrow x^2 + x - 2 = 0$; $(\mathbf{1}, \mathbf{3})$ and $(\mathbf{-2}, \mathbf{0})$

(b)

- $\displaystyle\int_{-2}^{1} (2 - x - x^2)\,dx$
- $\left[2x - \frac{x^2}{2} - \frac{x^3}{3}\right]_{-2}^1$
- $\frac{7}{6} - \left(-\frac{10}{3}\right) = \mathbf{\frac{9}{2}}$

(c)

- $\pi \displaystyle\int_0^2 (16 - 8x^2 + x^4)\,dx$
- $\pi\left(32 - \frac{64}{3} + \frac{32}{5}\right) = \dfrac{\mathbf{256}\pi}{\mathbf{15}}$