Solutions

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

2.1

- $\dfrac{1}{6-2}\displaystyle\int_{2}^{6} f(x)\,dx$

2.2

- $\dfrac{1}{5}\displaystyle\int_{0}^{5} 4x\,dx = \dfrac{1}{5}\big[2x^{2}\big]_{0}^{5} = \dfrac{1}{5}(50) = 10$

2.3

- $\dfrac{1}{2}\displaystyle\int_{0}^{2} 6x^{2}\,dx = \dfrac{1}{2}\big[2x^{3}\big]_{0}^{2} = \dfrac{1}{2}(16) = 8$

3.1 C

- the average value is the integral divided by the width

3.2

(a)

- $\dfrac{1}{8}\displaystyle\int_{0}^{8} (12-t)\,dt = \dfrac{1}{8}\big[12t - \tfrac{t^{2}}{2}\big]_{0}^{8} = \dfrac{1}{8}(96-32) = 8$

(b)

- litres per minute

3.3

- $\dfrac{1}{6}\displaystyle\int_{0}^{6} (20+6t-t^{2})\,dt = \dfrac{1}{6}\big[20t + 3t^{2} - \tfrac{t^{3}}{3}\big]_{0}^{6} = \dfrac{1}{6}(120+108-72) = \dfrac{1}{6}(156) = 26^{\circ}$