# DEFINITE INTEGRALS AND SUBSTITUTION

**1** Evaluate: **(a)** $\int_0^1 x\sqrt{1-x^2}\,dx$ using the substitution $u = 1 - x^2$

**(b)** $\int_{-1}^2 x\sqrt{2-x}\,dx$ using the substitution $u = 2 - x$

**4** Evaluate: **(a)** $\int_3^4 (2x-3)\left(x^2-3x+2\right)^2 dx$ using the substitution $u = x^2 - 3x + 2$

**(b)** $\int_0^2 \frac{x}{\left(x^2+2\right)^2} dx$ using the substitution $u = x^2 + 2$

**5** Evaluate: **(a)** $\int_0^1 \frac{t}{\sqrt{1+t}}\,dt$ using the substitution $u = 1 + t$

**(b)** $\int_0^1 3x^2\left(x^3 - 1\right)^4\,dx$ using the substitution $u = x^3 - 1$

**10** Find the area of the region bounded by the curve $y = \dfrac{x}{\sqrt{x^2 - 1}}$, the $x$-axis and the lines $x = \sqrt{2}$ and $x = \sqrt{5}$.