

INTEGRATION

1 Integrate with respect to x

a x^2 **b** x^6 **c** x **d** x^{-4} **e** 5 **f** $3x^2$
g $4x^7$ **h** $6x^{-2}$ **i** $8x^5$ **j** $\frac{1}{3}x$ **k** $2x^{-9}$ **l** $\frac{3}{4}x^{-3}$

2 Find

a $\int (2x + 3) dx$ **b** $\int (12x^3 - 4x) dx$ **c** $\int (7 - x^2) dx$ **d** $\int (x^2 + x + 1) dx$
e $\int (x^4 + 5x^2) dx$ **f** $\int x(x^2 - 3) dx$ **g** $\int (x - 2)^2 dx$ **h** $\int (3x^4 + x^2 - 6) dx$
i $\int (2 + \frac{1}{x^2}) dx$ **j** $\int (x - \frac{1}{x^3}) dx$ **k** $\int x^2(\frac{2}{x^4} - 3) dx$ **l** $\int (x - \frac{4}{x})^2 dx$

3 Integrate with respect to y

a $y^{\frac{1}{2}}$ **b** $y^{\frac{5}{2}}$ **c** $y^{-\frac{1}{2}}$ **d** $4y^{\frac{1}{3}}$ **e** $y^{\frac{3}{4}}$ **f** $5y^{-\frac{2}{3}}$
g $\sqrt[4]{y}$ **h** $\frac{7}{\sqrt{y}}$ **i** $\frac{1}{2y^2}$ **j** $\sqrt{y^3}$ **k** $\frac{5}{2y^4}$ **l** $\frac{1}{3\sqrt{y}}$

4 Find

a $\int (3t^{\frac{1}{2}} - 1) dt$ **b** $\int (2r + \sqrt{r}) dr$ **c** $\int (3p - 1)^2 dp$ **d** $\int (4x + x^{\frac{1}{3}}) dx$
e $\int (\frac{1}{y^3} + y) dy$ **f** $\int (\frac{1}{2}x^2 - x^{\frac{3}{2}}) dx$ **g** $\int \frac{t^3 + 2t}{t} dt$ **h** $\int (r^{\frac{5}{3}} - r^{\frac{2}{3}}) dr$
i $\int \frac{4p^4 - p^2}{2p} dp$ **j** $\int (4 - y^{\frac{7}{4}}) dy$ **k** $\int \frac{1 + 6x^2}{3x^2} dx$ **l** $\int \frac{2t + 3}{\sqrt{t}} dt$

5 Find $\int y dx$ when

a $y = 3x^2 - x + 6$ **b** $y = x^6 - x^3 + 2x - 5$ **c** $y = x(x - 2)(x + 1)$
d $y = (x^{\frac{1}{2}} + 2)^2$ **e** $y = (x^2 - 4)(2x + 3)$ **f** $y = x^3 - 2x^{\frac{4}{3}} + \frac{7}{x^2}$
g $y = \frac{1}{4x^3} - \frac{2}{3x^2}$ **h** $y = (1 - \frac{2}{x^2})^2$ **i** $y = (x^{\frac{5}{2}} - 1)(x^{\frac{3}{2}} + 1)$

6 Find a general expression for y given that

a $\frac{dy}{dx} = 8x + 3$ **b** $\frac{dy}{dx} = \frac{1}{2}x^3 - x^2$ **c** $\frac{dy}{dx} = \frac{4}{3x^3}$
d $\frac{dy}{dx} = (x + 1)^3$ **e** $\frac{dy}{dx} = 2x - \frac{3}{\sqrt{x}}$ **f** $\frac{dy}{dx} = x^{\frac{3}{2}} - 2x^{-\frac{3}{2}}$
g $\frac{dy}{dx} = \frac{3 - x^2}{2x^2}$ **h** $\frac{dy}{dx} = \frac{2}{x^3}(5 - x)$ **i** $\frac{dy}{dx} = \frac{9x - 2}{3\sqrt{x}}$