C1 INTEGRATION — *Worksheet A*

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 $\int (2x+3)\ \mathrm{d}x$ **b** $\int (12x^3-4x)\ \mathrm{d}x$ **c** $\int (7-x^2)\ \mathrm{d}x$ **d** $\int (x^2+x+1)\ \mathrm{d}x$

e $\int (x^4+5x^2)\ \mathrm{d}x$ **f** $\int x(x^2-3)\ \mathrm{d}x$ **g** $\int (x-2)^2\ \mathrm{d}x$ **h** $\int (3x^4+x^2-6)\ \mathrm{d}x$

i $\int (2+\frac{1}{x^2})\ \mathrm{d}x$ **j** $\int (x-\frac{1}{x^3})\ \mathrm{d}x$ **k** $\int x^2(\frac{2}{x^4}-3)\ \mathrm{d}x$ **l** $\int (x-\frac{4}{x})^2\ \mathrm{d}x$

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 $\int (3t^{\frac{1}{2}}-1)\ \mathrm{d}t$ **b** $\int (2r+\sqrt{r})\ \mathrm{d}r$ **c** $\int (3p-1)^2\ \mathrm{d}p$ **d** $\int (4x+x^{\frac{1}{3}})\ \mathrm{d}x$

e $\int (\frac{1}{y^3}+y)\ \mathrm{d}y$ **f** $\int (\frac{1}{2}x^2-x^{\frac{3}{2}})\ \mathrm{d}x$ **g** $\int \frac{t^3+2t}{t}\ \mathrm{d}t$ **h** $\int (r^{\frac{5}{3}}-r^{\frac{2}{3}})\ \mathrm{d}r$

i $\int \frac{4p^4-p^2}{2p}\ \mathrm{d}p$ **j** $\int (4-y^{\frac{7}{4}})\ \mathrm{d}y$ **k** $\int \frac{1+6x^2}{3x^2}\ \mathrm{d}x$ **l** $\int \frac{2t+3}{\sqrt{t}}\ \mathrm{d}t$

5 Find $\int y\ \mathrm{d}x$ 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 $\frac{\mathrm{d}y}{\mathrm{d}x}=8x+3$ **b** $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{1}{2}x^3-x^2$ **c** $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{4}{3x^3}$

d $\frac{\mathrm{d}y}{\mathrm{d}x}=(x+1)^3$ **e** $\frac{\mathrm{d}y}{\mathrm{d}x}=2x-\frac{3}{\sqrt{x}}$ **f** $\frac{\mathrm{d}y}{\mathrm{d}x}=x^{\frac{3}{2}}-2x^{-\frac{3}{2}}$

g $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{3-x^2}{2x^2}$ **h** $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{2}{x^3}(5-x)$ **i** $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{9x-2}{3\sqrt{x}}$