C4 INTEGRATION *Worksheet B*

1 Integrate with respect to x

a $(x-2)^7$ **b** $(2x+5)^3$ **c** $6(1+3x)^4$ **d** $(\frac{1}{4}x-2)^5$

e $(8-5x)^4$ **f** $\frac{1}{(x+7)^2}$ **g** $\frac{8}{(4x-3)^5}$ **h** $\frac{1}{2(5-3x)^3}$

2 Find

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

d $\int \mathrm{e}^{2x-3}\,\mathrm{d}x$ **e** $\int \frac{3}{2-7r}\,\mathrm{d}r$ **f** $\int \sqrt[3]{5t-2}\,\mathrm{d}t$

g $\int \frac{1}{\sqrt{6-y}}\,\mathrm{d}y$ **h** $\int 5\mathrm{e}^{7-3t}\,\mathrm{d}t$ **i** $\int \frac{4}{3u+1}\,\mathrm{d}u$

3 Given $\mathrm{f}'(x)$ and a point on the curve $y = \mathrm{f}(x)$, find an expression for $\mathrm{f}(x)$ in each case.

a $\mathrm{f}'(x) = 8(2x-3)^3$, $(2, 6)$ **b** $\mathrm{f}'(x) = 6\mathrm{e}^{2x+4}$, $(-2, 1)$

c $\mathrm{f}'(x) = 2 - \frac{8}{4x-1}$, $(\frac{1}{2}, 4)$ **d** $\mathrm{f}'(x) = 8x - \frac{3}{(3x-2)^2}$, $(-1, 3)$

4 Evaluate

a $\int_0^1 (3x+1)^2\,\mathrm{d}x$ **b** $\int_1^2 (2x-1)^3\,\mathrm{d}x$ **c** $\int_2^4 \frac{1}{(5-x)^2}\,\mathrm{d}x$

d $\int_{-1}^1 \mathrm{e}^{2x+2}\,\mathrm{d}x$ **e** $\int_2^6 \sqrt{3x-2}\,\mathrm{d}x$ **f** $\int_1^2 \frac{4}{6x-3}\,\mathrm{d}x$

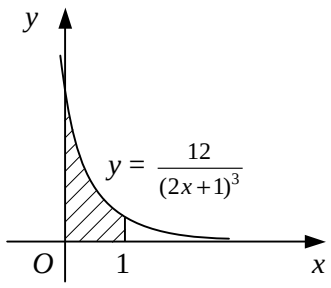
g $\int_0^1 \frac{1}{\sqrt[3]{7x+1}}\,\mathrm{d}x$ **h** $\int_{-7}^{-1} \frac{1}{5x+3}\,\mathrm{d}x$ **i** $\int_4^7 \left(\frac{x-4}{2}\right)^3\,\mathrm{d}x$

5 Find the exact area of the region enclosed by the given curve, the x-axis and the given ordinates. In each case, $y > 0$ over the interval being considered.

a $y = \mathrm{e}^{3-x}$, $x = 3$, $x = 4$ **b** $y = (3x-5)^3$, $x = 2$, $x = 3$

c $y = \frac{3}{4x+2}$, $x = 1$, $x = 4$ **d** $y = \frac{1}{(1-2x)^2}$, $x = -2$, $x = 0$

6



The diagram shows part of the curve with equation $y = \frac{12}{(2x+1)^3}$.

Find the area of the shaded region bounded by the curve, the coordinate axes and the line $x = 1$.