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A LEVEL MATHS

# (76) Integration (Definite Integrals)

## WORKING AT D/E

(1) Without using a calculator, show that

$$\int_1^3 (2x+4)dx = 16$$

(2) Evaluate each of the following. Give your answers as exact fractions where appropriate. You must show full workings:

(a) $\int_0^3 (x^4 + x)\,dx$

(b) $\int_1^4 \left(\frac{5}{x^2}\right) dx$

(c) $\int_4^9 (x^{-0.5} - 1)\,dx$

(d) $\int_1^{25} \left(x^{1/2}\right) dx$

(3) Evaluate $\int_1^8 \left(4 - 3t + \sqrt[3]{t}\right) dt$

## WORKING AT B/C

(1) Without using a calculator, show that

$$\int_2^8 \left(2x + \frac{1}{\sqrt{x}}\right) dx = 60 + 2\sqrt{2}$$

(2) Showing full workings, evaluate

$$\int_1^3 \left(\frac{6x^5 + x^3 - 2x}{x}\right) dx$$

## WORKING AT A*/A

(1) Given that:

$$\int_n^{4n} (2y+4)dy = 84 \qquad n > 0$$

Find the value of $n$. You must show full workings.

(2) Show, without a calculator, that

$$\int_3^{12} \left(\frac{1}{2\sqrt{p}} + \frac{3}{2}\sqrt{p}\right) dp = k\sqrt{3}$$

Where $k$ is a constant to be found.