INTEGRATION (Q 8, PAPER 1)

LESSON NO. 1: SIMPLE ALGEBRAIC INTEGRATION

2006

8 (a) Find (i) $\int \sqrt{x}\,dx$

SOLUTION

$$\int x^p\,dx = \frac{x^{p+1}}{p+1} + c \ \text{ for } \ p \in \mathbf{R} \ \text{ except } \ p \neq -1.$$ **1**

Remember it as:

Add one to the power of x and divide by the new power.

$$\int \sqrt{x}\,dx = \int x^{\frac{1}{2}}\,dx = \frac{x^{\frac{3}{2}}}{\frac{3}{2}} + c = \tfrac{2}{3}x^{\frac{3}{2}} + c$$

2005

8 (a) Find (i) $\int (2 + x^3)\,dx$

SOLUTION

$$\int (2 + x^3)\,dx = 2x + \tfrac{1}{4}x^4 + c$$

2004

8 (a) Find (i) $\int \frac{1}{x^2}\,dx$

SOLUTION

$$\int \frac{1}{x^2}\,dx = \int x^{-2}\,dx = \frac{x^{-1}}{-1} + c = -\frac{1}{x} + c$$

2003

8 (a) Find (i) $\int (x^3 + 2)\,dx$

SOLUTION

$$\int (x^3 + 2)\,dx = \tfrac{1}{4}x^4 + 2x + c$$

2002

8 (a) Find $\int (x^3 + \sqrt{x} + 2)\,dx.$

SOLUTION

$$\int (x^3 + \sqrt{x} + 2)\,dx = \int (x^3 + x^{\frac{1}{2}} + 2)\,dx = \tfrac{1}{4}x^4 + \tfrac{2}{3}x^{\frac{3}{2}} + 2x + c$$

2001

8 (a) Find (i) $\int \dfrac{1}{x^3}\,dx$

SOLUTION

$$\int \dfrac{1}{x^3}\,dx = \int x^{-3}\,dx = \dfrac{x^{-2}}{-2} + c = -\dfrac{1}{2x^2} + c$$