Integration

P1 | Study notes, worked example and practice

What to understand

Indefinite integration reverses differentiation. Add the constant of integration.

If a point on the curve is known, substitute its coordinates to find the constant.

Key formulae

$$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C \qquad (n \neq -1)$$

$$\int (af(x) + bg(x)) \, dx = a\int f(x) \, dx + b\int g(x) \, dx$$

Worked example

$$\int (6x^2 - 4) \, dx = 2x^3 - 4x + C$$

Increase each power by 1, divide by the new power, and include C.

Practice questions

Show your working. Try these without looking at the answers.

1. Find $\int(6x^2 - 4)\,dx$.

2. Given $\frac{dy}{dx} = 4x$ and $y = 7$ when $x = 1$, find y.

3. Find $\int 3\sqrt{x}\,dx$.

Answers

Use these to check the method as well as the final answer.

1. $2x^3 - 4x + C$.

2. $y = 2x^2 + 5$.

3. $2x^{3/2} + C$.