Integration Notation

The following notation could be used to differentiate an expression:

The dx here means differentiating "with respect to x".

$$\frac{d}{dx}(5x^2) = 10x$$

There is similarly notation for integrating an expression:

$$\int 10x \; dx = 5x^2 + c$$

"Integrate…"

"…this expression"

"…with respect to x"
(the dx is needed just as it was needed in the differentiation notation at the top of this slide)

This is known as **indefinite integration**, in contrast to definite integration, which we'll see later in the chapter.

It is called 'indefinite' because the exact expression is unknown (due to the $+c$).

Examples

1. Find $\int (x^{-\frac{3}{2}} + 2) \, dx$

2. Find $\int (6t^2 - 1) \, dt$

3. Find $\int (px^3 + q) \, dx$ where p and q are constants.

Test Your Understanding

Given that $y = 2x^5 + \dfrac{6}{\sqrt{x}}$, $x > 0$, find in their simplest form

(b) $\int y \, dx$

(3)