§ 4.9 - Antiderivatives

● Def^n: $F(x)$ is an antiderivative of $f(x)$ if $F'(x) = f(x)$.

Ex: An antiderivative of $f(x) = 2x + 3x^3$ is $F(x) = x^2 + \frac{3}{4}x^4$.

Why: $F'(x) = [x^2 + \frac{3}{4}x^4]' = 2x + 3x^3 = f(x)$

Qn: $F(x) = x^2 + \frac{3}{4}x^4 + 5$

$F'(x) = 2x + 3x^3 = f(x)$

$F(x) = x^2 + \frac{3}{4}x^4 + 27$

$F(x) = x^2 + \frac{3}{4}x^4 - \sqrt{2}$

The antiderivative of $f(x) = 2x + 3x^3$ is $F(x) = x^2 + \frac{3}{4}x^4 + C$, C is a constant.

If $F(x)$ is an antiderivative of $f(x)$, then so is $G(x) = F(x) + C$.

$$f(x) = 4x + 1 \ , \quad F(x) = 2x^2 + x + C$$

$$F'(x) = f(x)$$