15-3 Differentiation

Definition of Derivative

$$f'(x) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$

Find the derivative of $f(x) = x^4$

There is an easier way to find derivatives!!!!

The derivative of a <u>**CONSTANT FUNCTION**</u>, $f(x) = c$, is **ZERO**

The derivatives of x^n for $n = 1,2,3,4,5 \ldots$

$f(x)$	x	x^2	x^3	x^4	x^5
$f'(x)$					

Derivative $f(x) = x^n$

$$\text{If} \quad f(x) = x^n \ (n \in \mathbb{N}), \quad \text{then} \quad f'(x) = n\,x^{n-1}$$

Example

$f(x) = x^7$, find $f'(x)$

Derivatives of Sums

> The derivative of the sum of a finite number of differentiable functions is the sum of their derivatives

Examples

$f(x) = x^2 - 5x + 2$, find $f'(x)$ and $f'(-1)$

$f(x) = (x^2 - 5)^2$, find $f'(x)$ and $f'(2)$