$$f(x) = x^2 + 3x - 2$$

Find and simplify the difference quotient

$$\frac{f(x+h) - f(x)}{h}$$

$$f(x+h) = (x+h)^2 + 3(x+h) - 2$$

$$= (x+h)(x+h) + 3x + 3h - 2$$

$$= x^2 + 2xh + h^2 + 3x + 3h - 2$$

$$\frac{f(x+h) - f(x)}{h} = \frac{(x^2 + 2xh + h^2 + 3x + 3h - 2) - ((x^2 + 3x - 2))}{h}$$

$$= \frac{x^2 + 2xh + h^2 + 3x + 3h - 2 - x^2 - 3x + 2}{h}$$

$$= \frac{2xh + h^2 + 3h}{h}$$

$$= \frac{h(2x + h + 3)}{h}$$

$$= 2x + h + 3$$

$f(x) = 3x - 5$

Find $\dfrac{f(x+h) - f(x)}{h}$

$f(x+h) = 3(x+h) - 5$

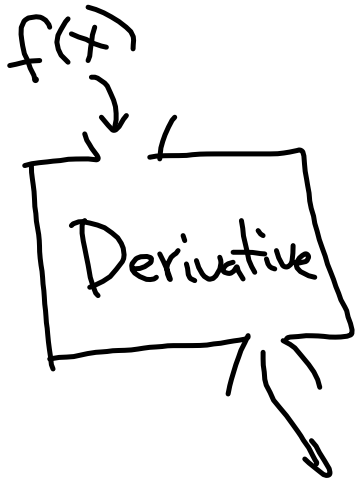
$= 3x + 3h - 5$

$\dfrac{f(x+h) - f(x)}{h} = \dfrac{(3x+3h-5) - (3x-5)}{h}$

$= \dfrac{3x + 3h - 5 - 3x + 5}{h}$

$= \dfrac{3h}{h}$

$= 3$



$f'(x)$ The derivative of f

Find the derivative of

$x^0 = 1$

$f(x) = 5x^3 - 7x^2 + 3x^1 - 2x^0$

$f'(x) = 3 \cdot 5x^{3-1} - 2 \cdot 7x^{2-1} + 1 \cdot 3x^{1-1} - 0 \cdot 2x^{0-1}$

$f'(x) = 15x^2 - 14x + 3.$

$g(x) = 4x^5 - 2x^4 + 7x^3 + x^2 + 6x - 11$

$g'(x) = 20x^4 - 8x^3 + 21x^2 + 2x + 6$

g-prime Differential

Integral