LINEARITY

LINEARITY

THEOREM

The derivative is *linear*:

$$(Af + Bg)' = Af' + Bg'.$$

EXAMPLE

EXAMPLE

Compute the derivative of

$$f(x) = 5x^2 + 3x.$$

PRODUCT RULE

PRODUCT RULE

THEOREM

$$(fg)' = fg' + f'g.$$

EXAMPLE

EXAMPLE

Show that $\frac{d}{dx} x^2 = 2x$.

EXAMPLE

EXAMPLE

Show that $\frac{d}{dx}x^3 = 3x^2$.

QUOTIENT RULE

QUOTIENT RULE

THEOREM

At points where $g \neq 0$,

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

EXAMPLE

EXAMPLE

Compute the derivative of $\frac{1}{x}$.

EXAMPLE

EXAMPLE

Compute the derivative of $\frac{x^2+1}{x-2}$ for $x \neq 2$.

TRIG FUNCTIONS

TRIG FUNCTIONS

THEOREM

$\frac{d}{dx}\sin x = \cos x$
$\frac{d}{dx}\cos x = -\sin x$
$\frac{d}{dx}\tan x = (\sec x)^2$

EXPONENTIAL FUNCTION

EXPONENTIAL FUNCTION

THEOREM

$$\frac{d}{dx}e^x = e^x$$