

ADE DLC-Calculus for Everyone
The Quotient Rule---1

The Quotient Rule

Say it in your own words...

ADE DLC-Calculus for Everyone
The Quotient Rule---1

The Quotient Rule

$$\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right] = \frac{g(x)f'(x) - f(x)g'(x)}{[g(x)]^2}$$

"Low-Dhigh minus Hi-DLow over
Low squared"

ADE DLC-Calculus for Everyone
The Quotient Rule---2

When would you use
The Quotient Rule
to take a derivative?

ADE DLC-Calculus for Everyone
The Quotient Rule---2

Use The Quotient Rule
when two functions are divided
like

$$y = \frac{x}{x+1}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---3

Find the derivative:
(Using the Quotient Rule)

$$y = \frac{x^2 + 3x}{2}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---3

$$\begin{aligned} y' &= \frac{2(2x) - (x^2 + 3x)0}{2^2} \\ &= \frac{4x}{4} \\ &= x \end{aligned}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---4

Find the derivative:
(Using the Quotient Rule)

$$y = \frac{4x - 3}{x^2 + 2}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---4

$$\begin{aligned} y' &= \frac{(x^2 + 2)(4) - (4x - 3)(2x)}{(x^2 + 2)^2} \\ &= \frac{4x^2 + 8 - 8x^2 - 6x}{(x^2 + 2)^2} \\ &= \frac{-4x^2 - 6x + 8}{(x^2 + 2)^2} \end{aligned}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---5

Find the derivative:
(Using the Quotient Rule)

$$y = \frac{1 - \cos x}{\sin x}$$

ADE DLC-Calculus for Everyone
The Quotient Rule---5

$$\begin{aligned} y' &= \frac{(\sin x)(\sin x) - (1 - \cos x)(\cos x)}{(\sin x)^2} \\ &= \frac{\sin^2 x - \cos x + \cos^2 x}{(\sin x)^2} \\ &= \frac{1 - \cos x}{(\sin x)^2} \end{aligned}$$