

Calculus One – Section 2.3 – Derivatives of a Product

Given $y = (2x + 4)(3x - 5)$ foil and then determine y'

Does it follow that if $y = f(x) \cdot g(x)$ then $y' = f'(x) \cdot g'(x)$?

If not, what works?

Try finding y' using the following formula: $\frac{d}{dx}[f(x) \cdot g(x)] = f(x) \cdot g'(x) + g(x) \cdot f'(x)$

Use this formula to determine the derivative of the following functions.

Example 1: $y = \sqrt{x^2 - 3}(2x + 3)$

Example 2: $g(s) = \sqrt{s}(2 + s^2)$

Example 3: $y = (x^3 + 4)(x^2 - 4)(x^3 - x + 4)$

Calculus One – Section 2.3 – Derivatives of a Quotient

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

to determine the derivative of the following functions.

Example 4: $y = \frac{3x^7}{\sqrt[3]{x+1}}$

Example 5: $f(s) = \frac{s}{3 + \sqrt{s}}$

Homework: Page 126, Problems 7 – 10, 25, 29

Sometimes it is better to “rewrite” the expression and then find the derivative than it is to use the product or quotient rule. Consider rewriting the following functions, and then find the derivatives.

Example 6: $g(x) = \sqrt{x}(x^2 - 3)$

Example 7: $f(x) = \frac{3x^2 + 5}{x}$

Example 8: $h(x) = x \left(2x + \frac{3}{x-5} \right)$

HW: Page 126, Problems 19, 21, 23, 27