The Product and Quotient Rules with Exponential Functions

Learning Objectives

- Use product and quotient rules to find the derivative of exponential functions with base e
- Use product and quotient rules to find the derivative of exponential functions with any base

Use product and quotient rules to find the derivative of exponential functions with base e

1. Find the derivative of $F(x) = xe^x$

2. Find the derivative of $G(x) = \frac{x^2}{e^x}$.

Use product and quotient rules to find the derivative of exponential functions with any base

3. Find the derivative of $h(x) = (x^2 - 4)2^x$.

4. Find the derivative of $H(x) = \frac{3^x - 1}{4^x + x}$. Do not simplify.

ANSWER KEY

1. $F'(x) = (x + 1)e^x$

2. $G'(x) = \frac{2x - x^2}{e^x}$

3. $h'(x) = 2^x(\ln 2 \cdot x^2 + 2x - 4\ln 2)$

4. $H'(x) = \frac{3^x(\ln 3)(4^x + x) - (4^x(\ln 4) + 1)(3^x - 1)}{(4^x + x)^2}$