

Objective: Differentiate natural exponential functions.

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

ANSWER:

The quotient rule must be applied.

$$f(x) = \frac{x^2}{e^x}$$

$$f'(x) = \frac{e^x(2x) - [x^2 e^x]}{e^{2x}}$$

$$= \frac{2xe^x - x^2 e^x}{e^{2x}}$$

$$= \frac{xe^x(2-x)}{e^{2x}}$$

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