

Differentiation of Exponential Functions

Graph $f(x) = e^x$ on the graphing calculator then use the **nderiv** function to graph its derivative.

$$\frac{dy}{dx} e^u = e^u \frac{du}{dx}$$

EX) Differentiate each function below.

A) $f(x) = e^{3x-2}$

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

C) $f(x) = \frac{e^{x^3}}{x^2}$

Graph $f(x) = 2^x$ on the graphing calculator then use the **nderiv** function to graph its derivative.

$$\frac{dy}{dx} b^u = \ln b \cdot b^u \frac{du}{dx}$$

EX) Differentiate $f(x) = 5^{-x^2}$

EX) Find $\frac{dy}{dx}$ for $x^2 e^y + xy = e^x$

EX) If the half-life of a \$24,000 swimming pool is 7 years, what is the **rate** of decrease in its value in the 10th year (assuming the value decreases exponentially)?

EX) \$100,000 is invested for 10 years at a rate of 5%. What is the **rate** of growth (in \$/year) in that 10th year?