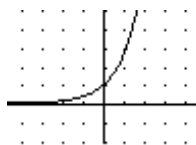


Section 9.1: Exponential Functions

Objectives:

- ✦ Evaluate exponential functions.
- ✦ Graph exponential functions.
- ✦ Define the natural base e and graph natural exponential functions.
- ✦ Use the natural base e in an application.

$$f(x) = e^x$$

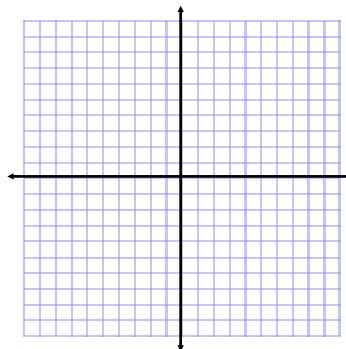


Exponential Functions

$$f(x) = a^x \quad a > 0 \quad a \neq 1$$

$$f(x) = a^x \quad f(x) = x^a$$

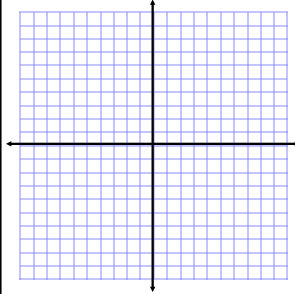
$$y = 2^x$$



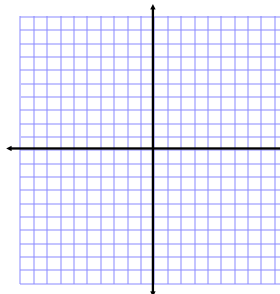
① EXAMPLE

Sketch these using transformations of $y = a^x$

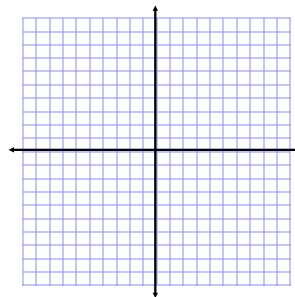
a) $y = 3^{-x}$



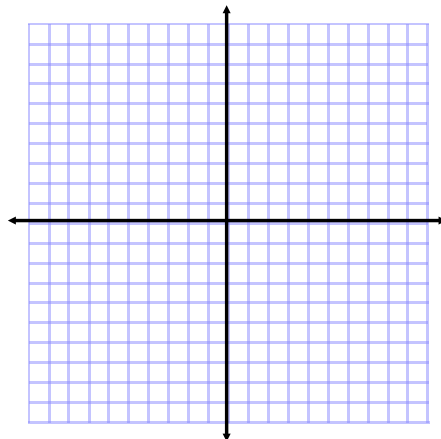
b) $y = -2^x$



c) $y = 5^{x+1}$

Introducing a new constant.... meet e .

$$y = e^x$$



② EXAMPLE

Simplify these expressions.

$$a) \sqrt{4e^{6x}}$$

$$b) \frac{6e^5}{10e^7}$$

$$c) (e^3)^2$$

$$d) e^{2x}e^{-3x}$$

③ EXAMPLE

Evaluate these functions at the given value.

$$a) g(x) = 10,000(1.03)^{4x}$$

$$g(1) =$$

$$g(3) =$$

$$b) P(t) = \frac{6000}{2 + e^{0.05t}}$$

$$P(2) =$$

$$P(0) =$$

APPLICATION

$$y = Pe^{rt}$$

When your child is born you deposit \$5000 in an account that pays 3% continuously compounded interest. How much will be there when the child turns 18?