BIG IDEAS
For Your Notebook
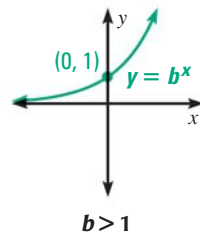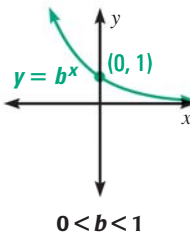
Big Idea 1

TEKS 2A.11.B

Graphing Exponential and Logarithmic Functions

Parent functions for exponential functions have the form $y = b^x$. Parent functions for logarithmic functions have the form $y = \log_b x$.
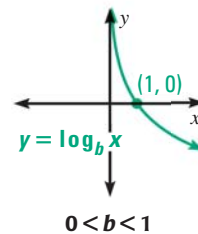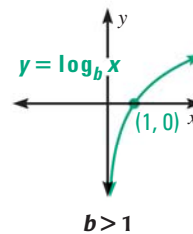
Exponential Growth

$(0, 1)$ $y = b^x$

$b > 1$

Exponential Decay

$y = b^x$ $(0, 1)$

$0 < b < 1$

Logarithmic Functions

$y = \log_b x$ $(1, 0)$

$b > 1$

$(1, 0)$ $y = \log_b x$

$0 < b < 1$

Big Idea 2

TEKS 2A.11.D

Solving Exponential and Logarithmic Equations

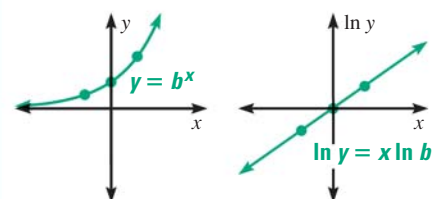| Solving an Exponential Equation	Solving a Logarithmic Equation
If each side can be written using the same base, equate exponents. $$3^{x+1} = 9^x$$ $$3^{x+1} = (3^2)^x$$ $$x + 1 = 2x$$ $$1 = x$$	If the equation has the form $\log_b x = \log_b y$, use the fact that $x = y$. $$\log_2 (4x - 2) = \log_2 3x$$ $$4x - 2 = 3x$$ $$x = 2$$
If each side cannot be written using the same base, take a logarithm of each side. $$6^x = 15$$ $$\log_6 6^x = \log_6 15$$ $$x = \frac{\log 15}{\log 6} \approx 1.511$$	If a logarithm is set equal to a constant, exponentiate each side. $$\log_5 (x + 1) = 2$$ $$x + 1 = 5^2$$ $$x = 24$$

Big Idea 3

TEKS 2A.11.F

Writing and Applying Exponential and Power Functions

Write an Exponential Model	Write a Power Model
An exponential model fits a set of data pairs (x, y) if a linear model fits the set of data pairs $(x, \ln y)$.	A power model fits a set of data pairs (x, y) if a linear model fits the set of data pairs $(\ln x, \ln y)$.

$y = b^x$

$\ln y = x \ln b$

$y = x^b$

$\ln y = b \ln x$