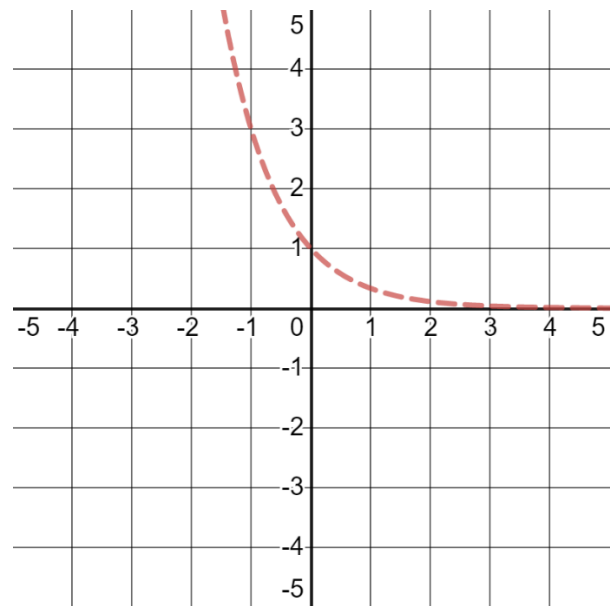
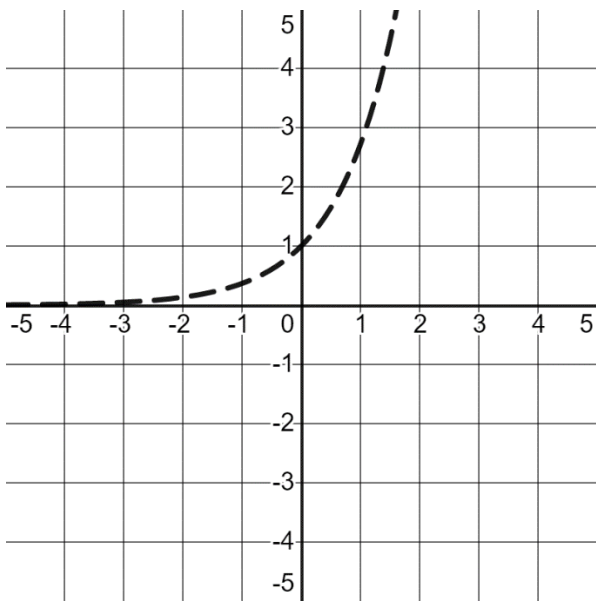


Exponential Inverses

<p>KNOW The inverse of an exponential is a log of the same base and knows the domain and range of a log function.</p>	<p>DO Can find the exact equation in base e to an exponential. Can graph the basic $\ln x$.</p>	<p>UNDERSTAND <i>Function Characteristics:</i></p>
<p>Vocab & Notation</p> <ul style="list-style-type: none"> • Logarithm, $\log x$ • Natural log, $\ln x$ 		

Graph the inverse of $y = e^x$ and $y = (1/3)^x = 3^{-x}$



Since the exponential function $f(x) = b^x$ needs that the base $b > 0$ and $b \neq 1$, we have the same restriction on the function $f^{-1}(x) = \log_b x$.

There are three common bases that you will use depending on your field.

- Engineering: Base 10
- Science and Mathematics: Base e
- Computer Science: Base 2

Example: Solve for k

$$500 = 10^k$$

$$2 = e^k$$

Practice: Solve for x

$$1200 = 10^x$$

$$20 = e^x$$

$$9 = \log_2 x$$

$$5 = \frac{1}{4^k}$$

$$3 = \log k$$

$$8 = \ln x$$

$$17 = \ln(e^k)$$

$$32 = 10^{\log k}$$

$$22 = \ln(\ln k)$$

When we evaluate an exponential $2^6 = x$, we are asking:
2 to the power of 6 is what?

When we evaluate a logarithm, we are asking the inverse. For $\log_2 32 = x$ we are asking:
2 to what power is 32?

Practice: Without a calculator evaluate the following:

$$\log_3 729$$

$$\log_5 625$$

$$\log_{19} 361$$