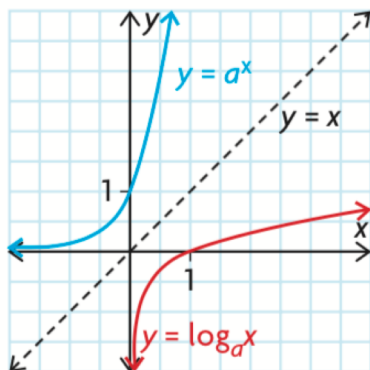


8.1 Exploring the Logarithmic Function

- ✓ The inverse of the exponential function $y = b^x$ is known as the **logarithmic function** $y = \log_b x$.
- ✓ Since $x = a^y$ and $y = \log_b x$ are equivalent, a logarithm is an exponent. The expression $\log_b x$ means “the exponent that must be applied to base b to get the value of x .” E.g. $\log_2 8 = 3 \leftrightarrow 2^3 = 8$
- ✓ **Logarithmic function** $y = \log_b x, b > 0, b \neq 1$

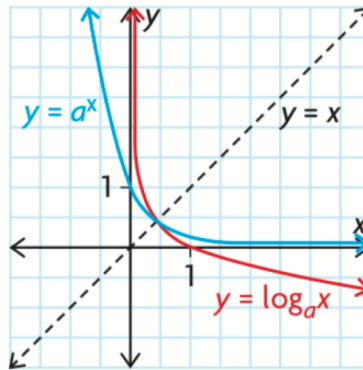


Base graph: $b > 1$; an increasing function

Domain: $x \in (0, \infty)$

Range: $y \in (-\infty, \infty)$

Intercepts: x -int = 1; no y -int



$0 < b < 1$; a decreasing function

$x \in (0, \infty)$

$y \in (-\infty, \infty)$

x -int = 1; no y -int

Ex. 1 Write the equation of each of the following logarithmic function in exponential form.

a) $y = \log_3 x$

b) $y = \log_{\frac{1}{5}} x$

Ex. 2 Evaluate each of the following.

a) $\log_{10} 100$

b) $\log_3 81$

c) $\log_7 1$

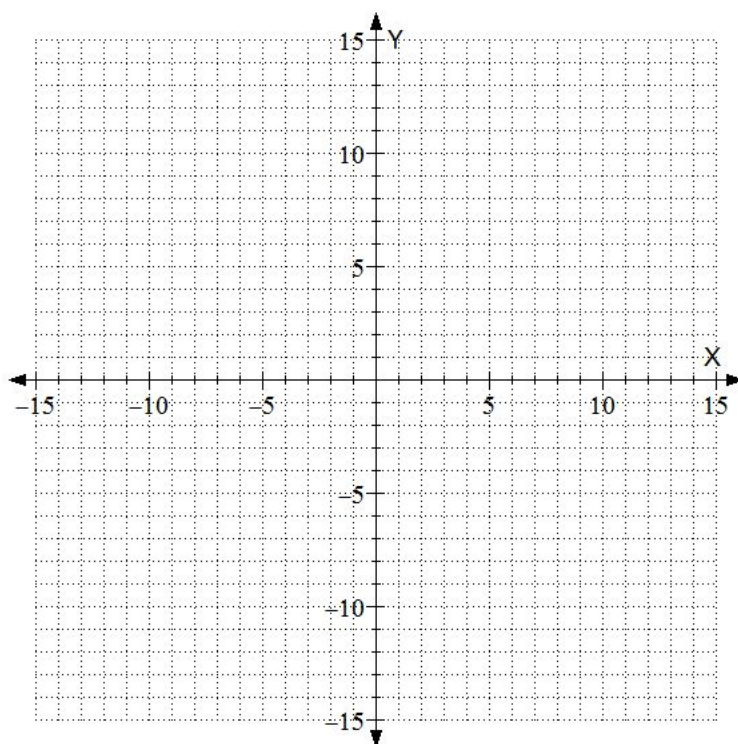
d) $\log_9 3$

Ex. 3 Write the coordinates of the five points that have y -values of -2, -1, 0, 1, 2

a) $y = \log_{10} x$

b) $y = \log_{\frac{1}{3}} x$

How would you graph $y = 2 \log_3(x - 5)$?



How would you graph $y = \log_{\frac{1}{4}}(2x) + 5$?

