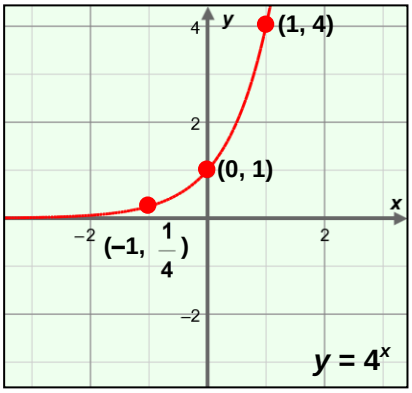
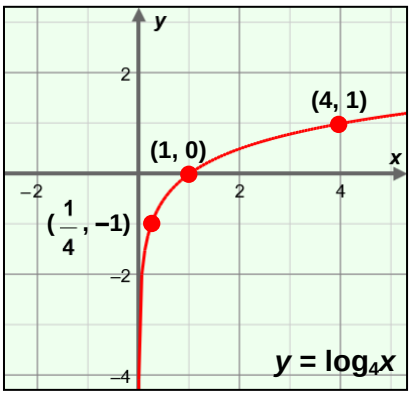
Vocabulary: Logarithmic Functions

Vocabulary

- Asymptote – a line that a curve approaches as x or y goes to infinity.
- Base – a number or expression raised to an exponent.
  - The logarithmic function $y = \log_b(x)$ is said to have base b, because $y = \log_b(x)$ written in exponential form is $b^y = x$.
- Domain – the set of all x-values of a relation or function.
- Exponent – a number, written to the right of and just above a number or expression, that indicates how many times the number or expression is multiplied by itself.
- Exponential function – a function of the form $y = a \cdot b^{kx}$, where $a \neq 0$, $b > 0$, and $b \neq 1$.
  - For example, the function $y = 4^x$, graphed to the right, is exponential.
    - Some "key points" on the graph of $y = 4^x$ are $(-1, \frac{1}{4})$, (0, 1), (1, 4), (2, 16), etc.
    - For $y = 4^x$, every time x increases by 1, y is multiplied by a factor of 4.



- Inverse function – a function that "reverses" or "undoes" another function.
  - If the point (x, y) lies on the graph of the original function, then (y, x) lies on the graph of its inverse function.
  - The graph of an inverse function is the graph of the original function reflected across the line $y = x$.
- Logarithmic function – the inverse of an exponential function.
  - The logarithmic function $y = \log_b(x)$ is the inverse of $y = b^x$, where $b > 0$ and $b \neq 1$.
  - For example, the function $y = \log_4(x)$, graphed to the right, is logarithmic.
    - "Key points" on the graph of $y = \log_4(x)$ include $(\frac{1}{4}, -1)$, (1, 0), (4, 1), (16, 2), etc.
    - The value of $\log_4(1) = 0$ because $4^0 = 1$.



- Range – the set of all y-values of a relation or function.