

§5.2 Logarithmic Functions and Their Graphs

Logarithm :

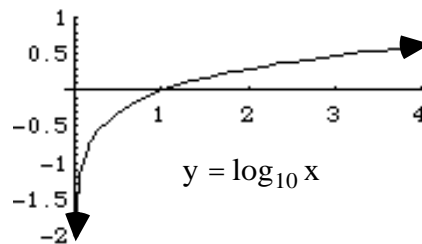
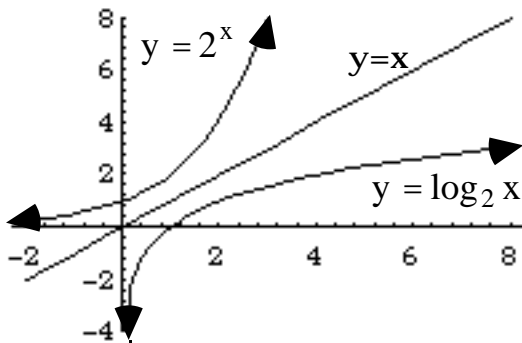
For all real numbers y , and all positive numbers a and x , where $a \neq 1$:

$$y = \log_a x \quad \text{if and only if} \quad x = a^y.$$

Graphs of the Form: $f(x) = \log_a x$

- 1) The point $(1, 0)$ is on the graph.
- 2) If $a > 1$, f is an increasing function; If $0 < a < 1$, f is a decreasing function.
- 3) The y -axis is a vertical asymptote.
- 4) The domain is $(0, \infty)$ and the range is $(-\infty, \infty)$.

Examples:



Example: $y = \log_5(x - 1) + 4$

Find the domain, vertical asymptote, and x -intercept of the logarithmic function and sketch its graph.

HW: pg. 408 #1- 55 ODDS

