# I. Logarithm DEFINITION (p.292):

$y = \log_b(x)$ really "means" that $x = b^y$

Note: If one solves "$x = b^y$" for $y$ the result yields the inverse function of $y = b^x$, thus the notation "$y = \log_b(x)$" is basically the conventional equation form for $f^{-1}$.

# II. Two Special Logarithms –

1. Common Log: $y = \log(x)$

   represents $y = \log_{10}(x) \Leftrightarrow x = 10^y$

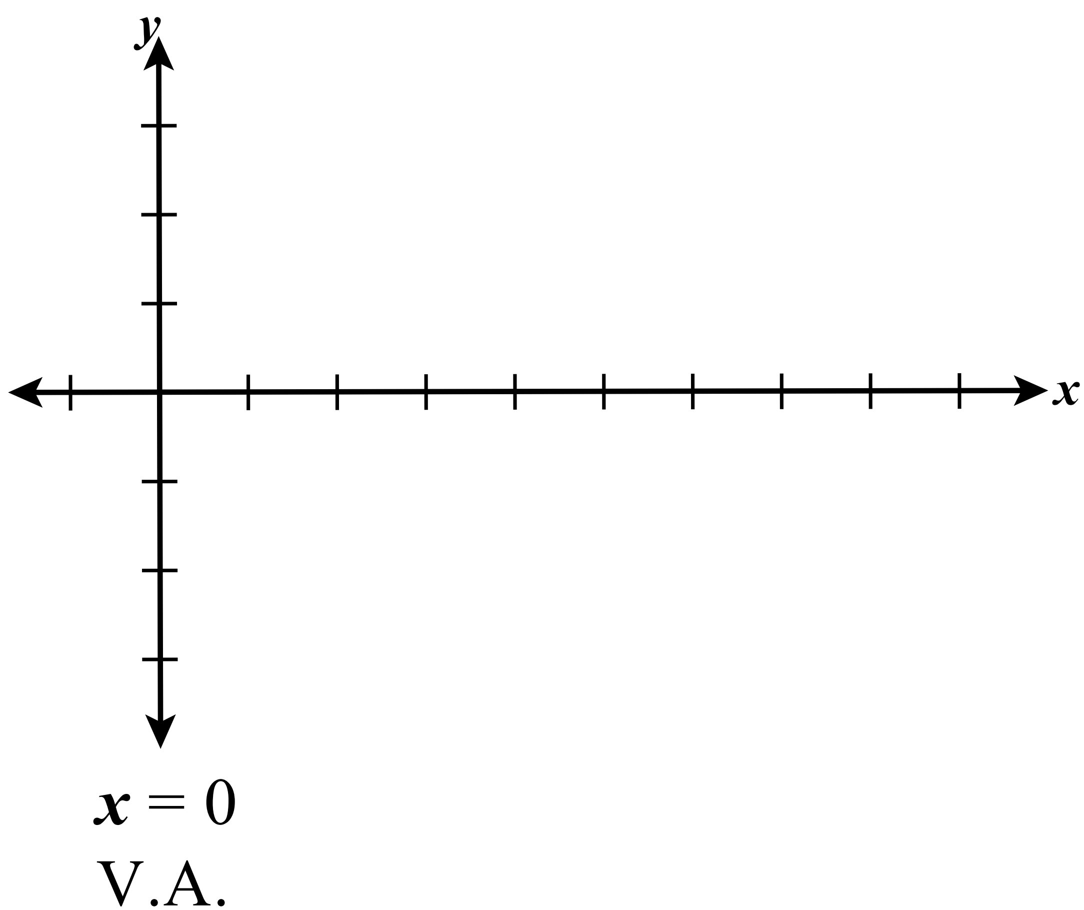
2. Natural Log: $y = \ln(x)$

   represents $y = \log_e(x) \Leftrightarrow x = e^y$

# III. Examples (p.301): Exercises #10,16,20,22,24

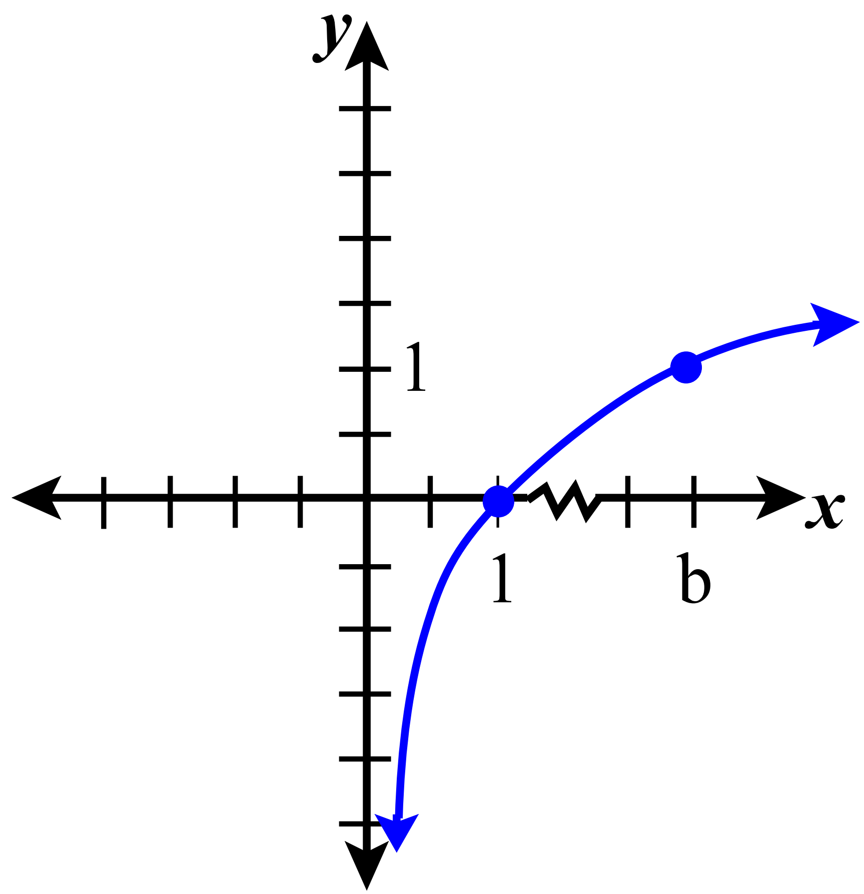
# IV. The Natural Logarithm: $f(x) = \ln(x)$

| $x$ | $y = \ln(x)$ |
|---|---|
| | |



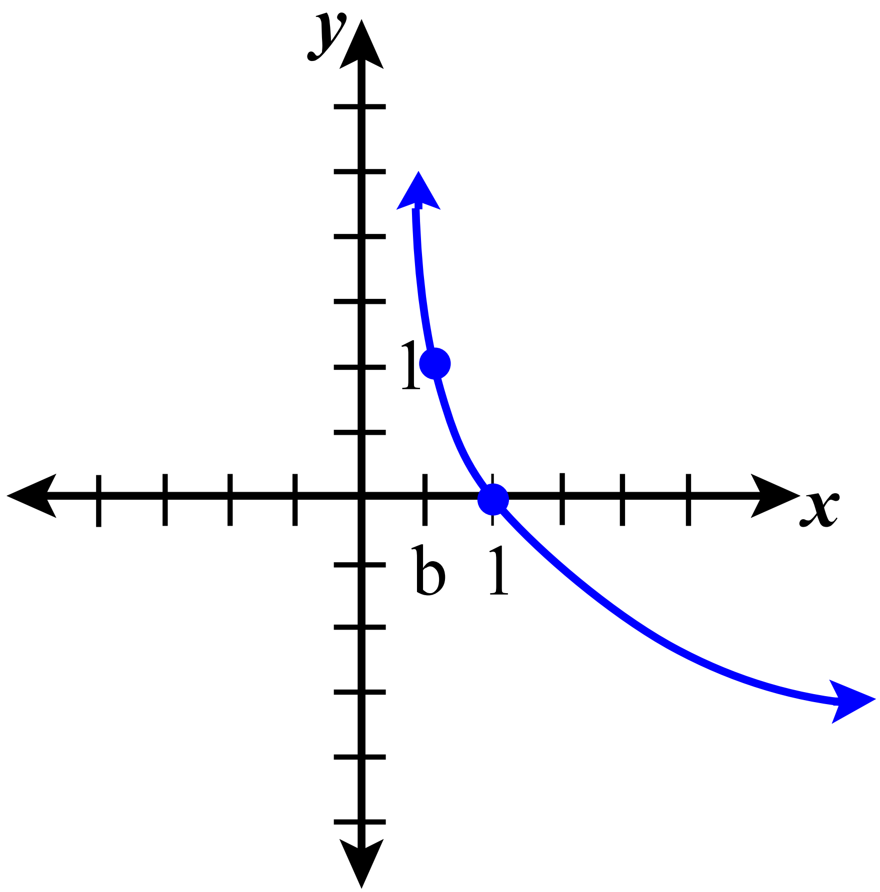
V. $f(x) = \log_b(x)$

1. If $b > 1$, then




$y$-axis is a vertical asymptote ($y \to -\infty$ as $x \to 0$)

2. If $0 < b < 1$, then




$y$-axis is a vertical asymptote ($y \to +\infty$ as $x \to 0$)

VI. Salient Properties: see p.295

HW: p.301 / Exercises #9-31(odd)
Read section 4.2 (pp.292-300)