## _Graphing Logarithmic Functions_

**Learning Targets:  Students will be able to graph logarithmic functions.**
**Students will be able to define the domain and range of logarithmic functions.**

**What are those three special points again?**

## Transformations

$y = \log_a x \pm 2$ $\qquad$ $y = \log_a (x \pm 2)$ $\qquad$ $y = \log_a (-x)$ $\qquad$ $y = -\log_a x$

## SPECIAL LOGARITHMS
### Common Log                                        Natural Log
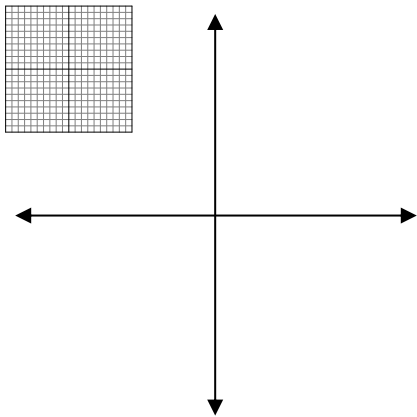$$\log 4 = \log_{10} 4$$ $\qquad\qquad$ $$\ln 4 = \log_e 4$$

**Graph the following logarithmic functions using the three special points. Label the vertical asymptote and find the domain and range.**
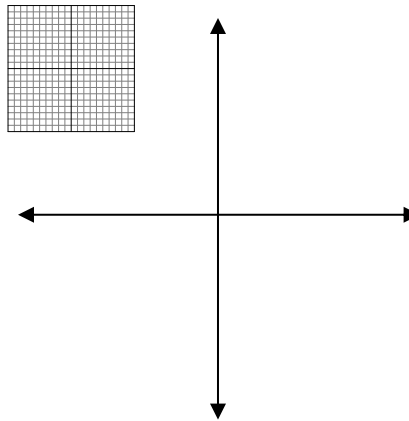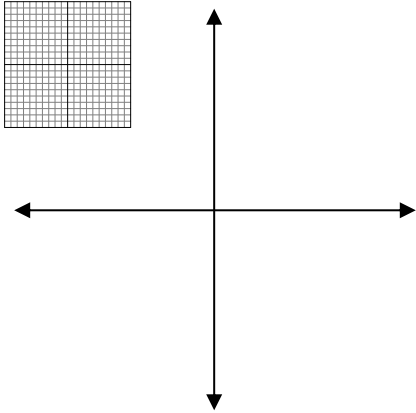
**Ex 1.** $y = \log_4 (x - 3) + 5$ $\qquad\qquad$ **Ex 2.** $y = \log_5 (x + 2) - 3$

**Domain** _____ $\qquad\qquad$ **Domain** _____

**Range** _____ $\qquad\qquad$ **Range** _____

**Graph the following logarithmic functions using the three special points. Label the vertical asymptote and find the domain and range.**
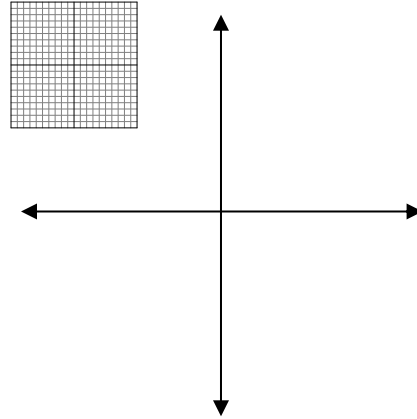
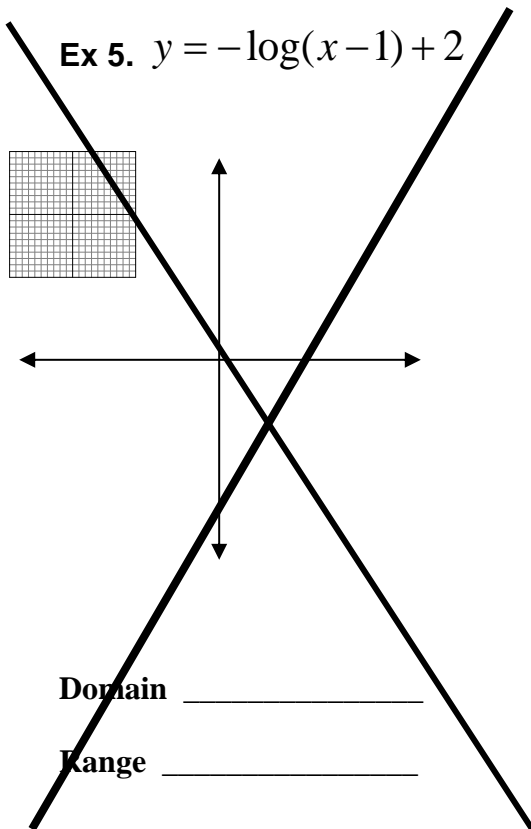**Ex 3.** $y = \log_2(x + 1)$

Domain _____

Range _____

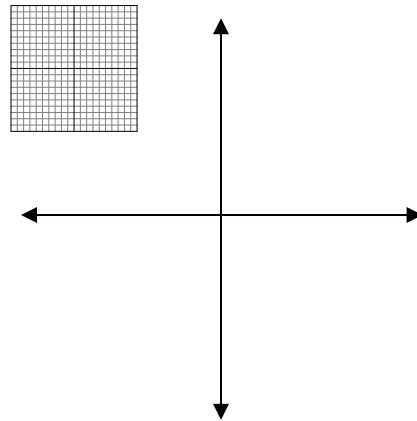**Ex 4.** $y = \log_{1/2}(x - 2) - 1$

Domain _____

Range _____

**Ex 5.** $y = -\log(x-1) + 2$

Domain _____

Range _____

**Ex 6.** $y = \ln(x-4) - 3$

Domain _____

Range _____