

## NOTES CHAPTER 6

Name: \_\_\_\_\_

### Section 6.1 Logarithms and Logarithmic Functions

I understand the definition of a logarithm

I can convert between logarithmic form and exponential form

I can use exponential form to solve a log problem

I can graph  $f(x) = \log_b x$

I can graph transformations of log functions

#### Definition of Logarithm with base b:

Let  $b$  and  $y$  be positive numbers with  $b \neq 1$ .

The logarithm of  $y$  with base  $b$  is denoted  $\log_b y$  is defined as follows:

$$\log_b y = \underline{\quad} \text{ if and only if } b^x = \underline{\quad}$$

The expression  $\log_b y$  is read as "log base  $b$  of  $y$ "

$\log_b x = y$  if and only if  $b^y = x$

#### I can convert between logarithmic form and exponential form

Logarithmic form

Exponential form

a.  $\log_2 32 = 5$

\_\_\_\_\_

b.  $\log_7 1 = 0$

\_\_\_\_\_

c.  $\log_{13} 13 = 1$

\_\_\_\_\_

d.  $\log_{\frac{1}{2}} 2 = -1$

\_\_\_\_\_

Checkpoint: Rewrite the equation in exponential form.

1.  $\log_{18} 1 = 0$

2.  $\log_2 64 = 6$

#### I can use exponential form to solve a log problem

a.  $\log_3 81 = x$

b.  $\log_4 0.25 = x$

c.  $\log_{\frac{1}{4}} 256 = x$

d.  $\log_{49} 7 = x$

Checkpoint: Evaluate the logarithm.

3.  $\log_{\frac{1}{3}} 9 = x$

4.  $\log_{16} 4 = x$

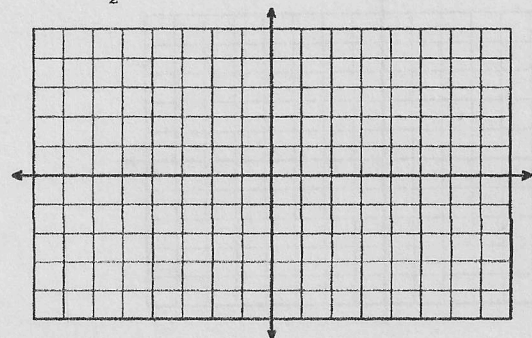
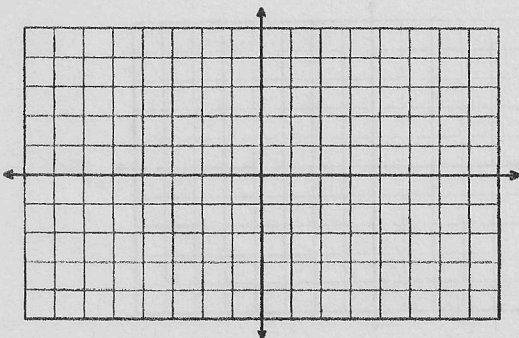
#### I can graph $f(x) = \log_b x$

$y = 3^x$  Domain: Range:

$y = \log_3 x$  Domain: Range:

$y = \frac{1}{2}^x$  Domain: Range:

$y = \log_{\frac{1}{2}} x$  Domain: Range:

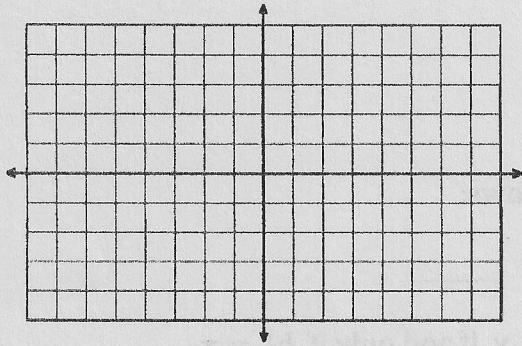


Checkpoint: Graph  $f(x) = \log_b x$

$$f(x) = \log_5 x$$

Domain:

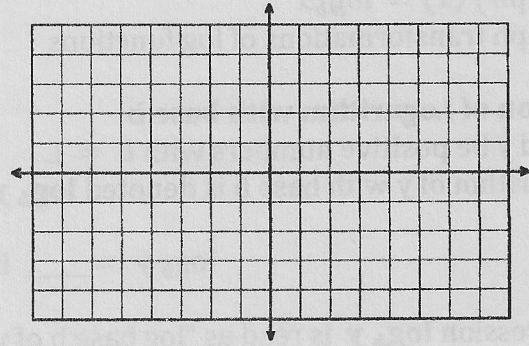
Range:



$$f(x) = \log_{\frac{1}{3}} x$$

Domain:

Range:



Graph logarithmic functions with translations:

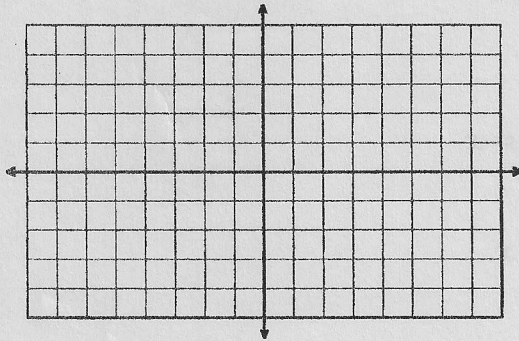
$$f(x) = a \log_b(x - h) + k$$

Graph:

$$f(x) = \log_3(x - 2) + 3$$

Domain:

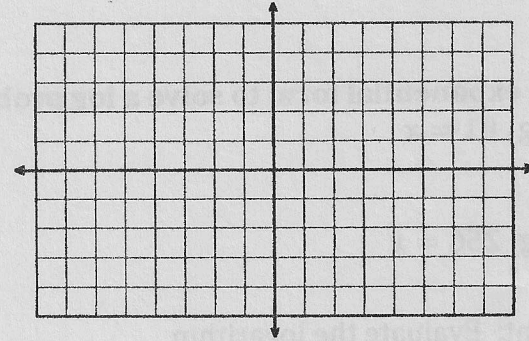
Range:



$$f(x) = -2 \log_{\frac{1}{4}} x - 1$$

Domain:

Range:

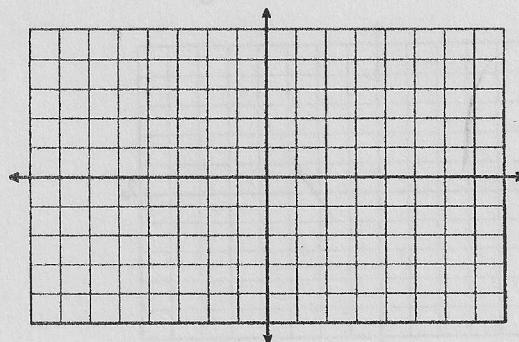


Checkpoint: Graph logarithmic functions with transformations.

$$f(x) = \log_4(x + 3) - 2$$

Domain:

Range:



$$f(x) = 3 \log_{\frac{1}{2}} x + 2$$

Domain:

Range:

