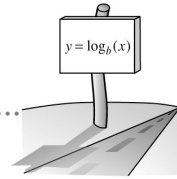**5.2.4**   What does a log graph look like?

Graphing Logarithmic Functions
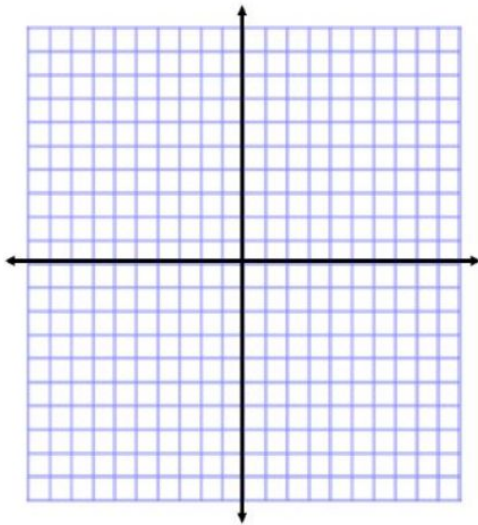
$y = \log_b(x)$

#93 GRAPHING THE LOGARITHMIC FUNCTION
Sakura needs to graph $y = \log(x)$, but she does not have a calculator and needs your help.

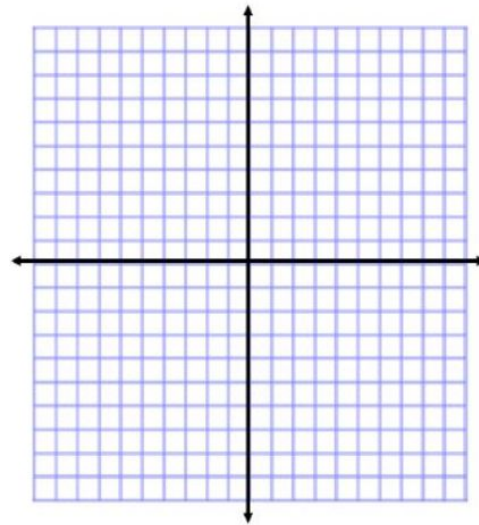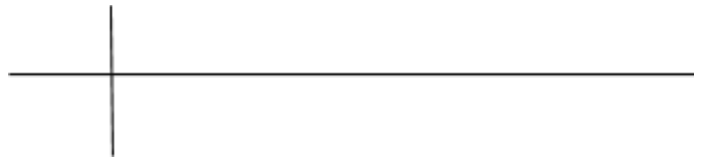| a. Write the equivalent exponential equation for $y = \log(x)$.	b. Logarithms and exponents are related, but how? What is the inverse equation of $y = 10^x$?
c. Make a table and sketch a graph of $y = 10^x$. State the domain and range.	d. Use your table to and graph from part (c) to make a table and graph $y = \log(x)$. State the domain and range.

Domain: Range: Domain: Range:
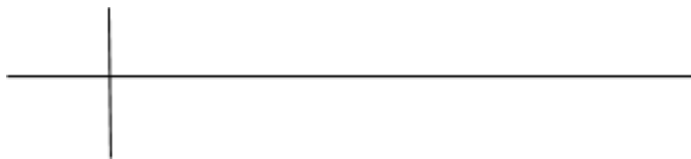
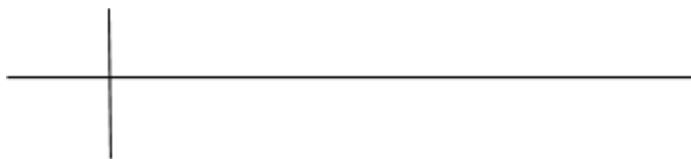e. Explain to Sakura a strategy she can use to graph $y = \log(x)$.

#94 GRAPHING LOGARITHMIC FUNCTIONS IN DIFFERENT BASES
Work with your team to graph graph $y = \log(x)$, $y = \log_2(x)$ and $y = \ln(x)$ on the same set of axes. Use your work from problem 5-93 as a guide. Be prepared to share your strategies and graphs with the class.
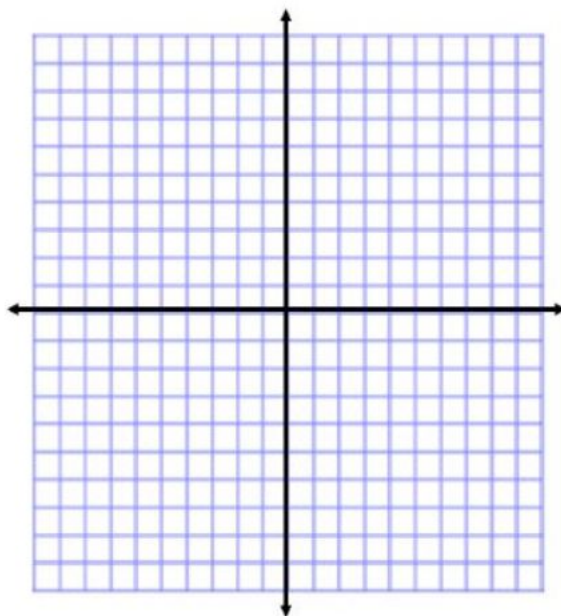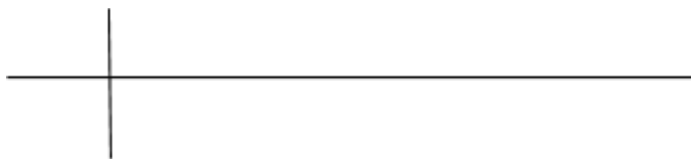
$y = \log(x)$

$y = \log_2(x)$

$y = \ln(x)$

With your team, study how the graphs of $y = \log(x)$, $y = \log_2(x)$, and $y = \ln(x)$ compare. For $x > 1$, how does $\log_a(x)$ compare to $\log_b(x)$ if $b > a$?
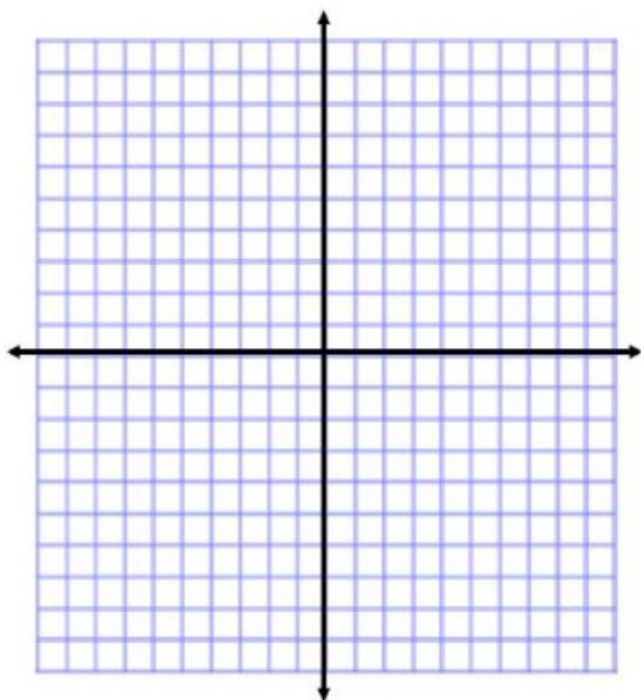
#95 TRANSFORMING LOGARITHMIC FUNCTIONS
Graph each of the following transformations. For each function, describe the transformation and state the domain and range.

a. $y = 5\log_3(x)$	b. $y = \log_{0.5}(x) - 2$

a. $y = 5\log_3(x)$

Describe Transformation:

x			
$\log_3(x)$			
$5\log_3(x)$			

Domain:

Range:

b. $y = \log_{0.5}(x) - 2$

Describe Transformation:

x			
$\log_{0.5}(x)$			
$\log_{0.5}(x) - 2$			
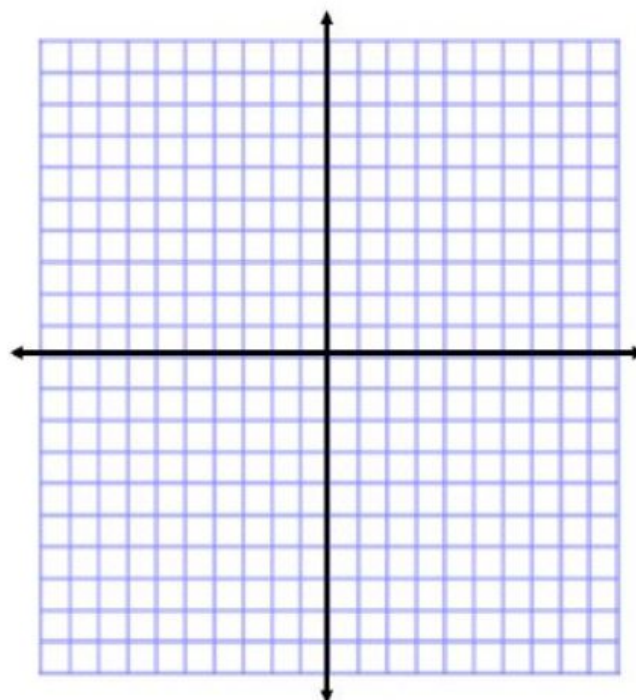
Domain:

Range:

#95 Continued

c. $y = \log_2(x - 3)$

Describe Transformation:

x			
$\log_2(x)$			
$\log_2(x - 3)$			
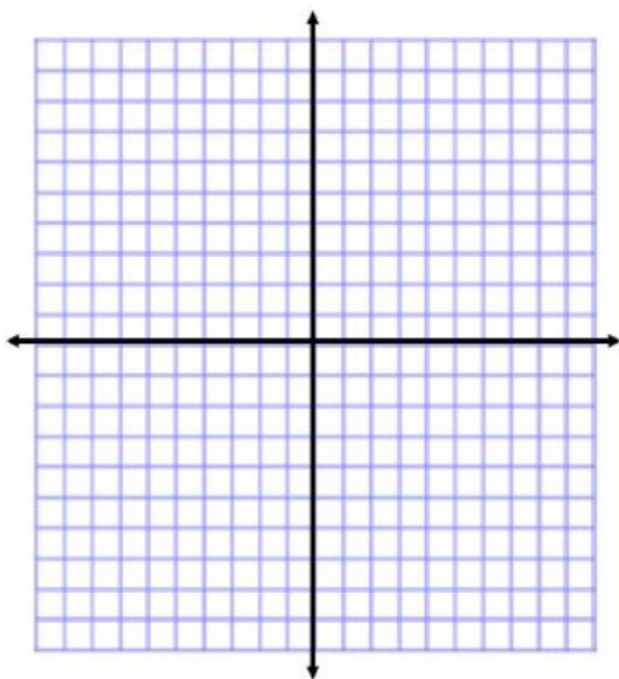
Domain:

Range:

d. $y = -\log_4(x)$

Describe Transformation:

x			
$\log_4(x)$			
$-\log_4(x)$			

Domain:

Range: