

Assignment 4B: Graphing Logarithmic Functions

Answer the following problems with as much details, explanations, and work that is appropriate.

1. Rewrite each equation in exponential form, then evaluate the logarithm.

a. $x = \log_4 64$

b. $x = \log_2 32$

c. $x = \log 100000$

For each function (a) find the domain, (b) the equation of the vertical asymptote, (c) and describe the transformation of $f(x) = \log(x)$.

2. $f(x) = \log(x+2)$

Domain: $(-2, \infty)$, **vertical asymptote:** $x = -2$.

3. $f(x) = \log(3x+1)$

Domain: $(-\frac{1}{3}, \infty)$, **vertical asymptote:** $x = -\frac{1}{3}$.

4. $f(x) = 2\log(-x)+1$

Domain: $x < 0$, **vertical asymptote:** $x = 0$.

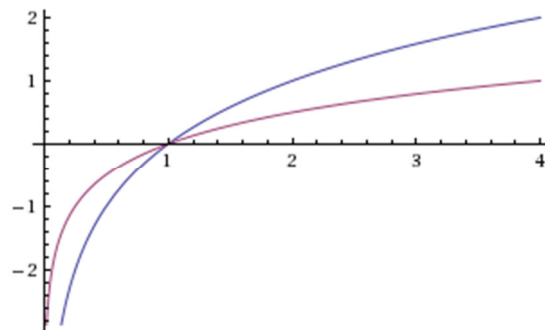
5. Sketch a graph of each pair of function.

$$f(x) = \log_2(x), \quad g(x) = \log_4(x)$$

Describe the similarities & differences in these graphs.

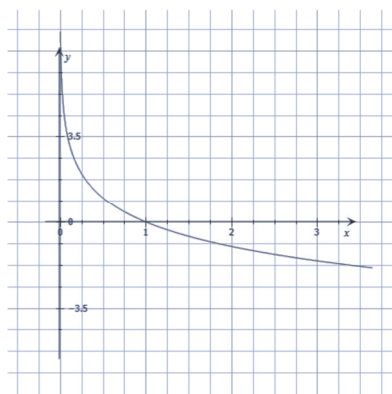
Both pass through (1,0) and have an asymptote of $x=0$.

$\log_4(x)$ is below $\log_2(x)$ for $(0, \infty)$

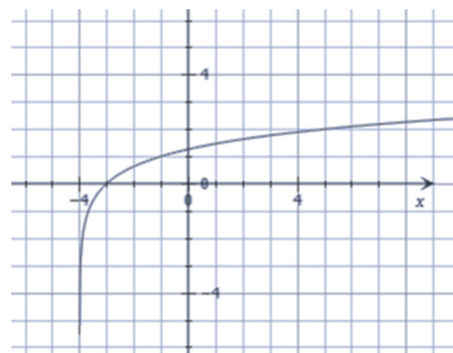


Sketch each transformation.

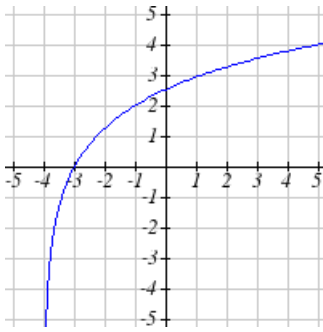
6. $y = -\log_2(x)$



7. $f(x) = \log_3(x+4)$



8. Find a formula in the form $f(x) = a \log_b(x + c)$ for the transformed logarithm graph shown.



$$f(x) = 2 \log_3(x + 4)$$