

Review Exercise Set 8

Exercise 1: Write the given logarithmic expression in its equivalent exponential form using the inverse property $y = \log_b x \iff x = b^y$.

$$\log_4 64 = 3$$

Exercise 2: Write the given exponential expression in its equivalent logarithmic form using the inverse property $x = b^y \iff y = \log_b x$.

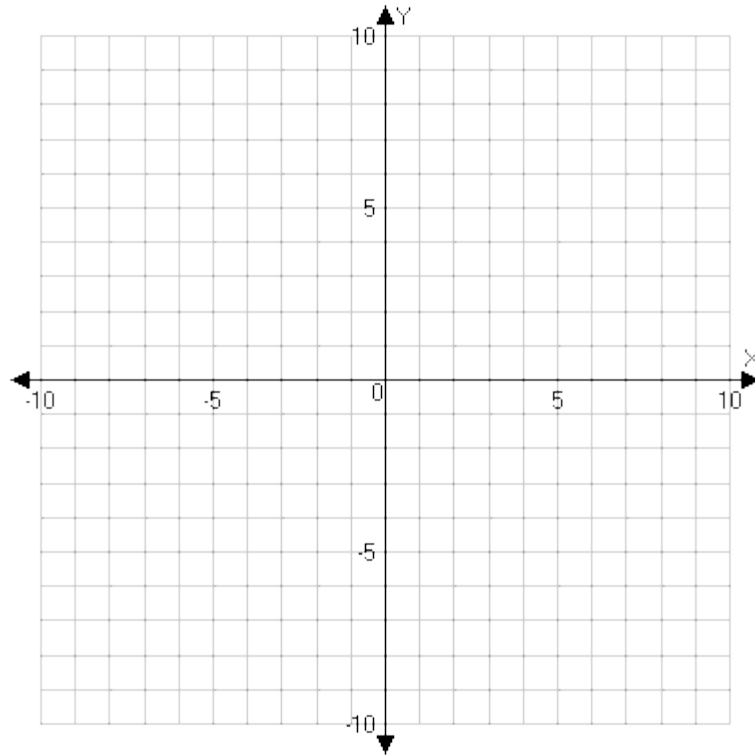
$$8^{-1/3} = \frac{1}{2}$$

Exercise 3: Find the exact value of x in the following logarithmic equation.

$$x = \log_3 243$$

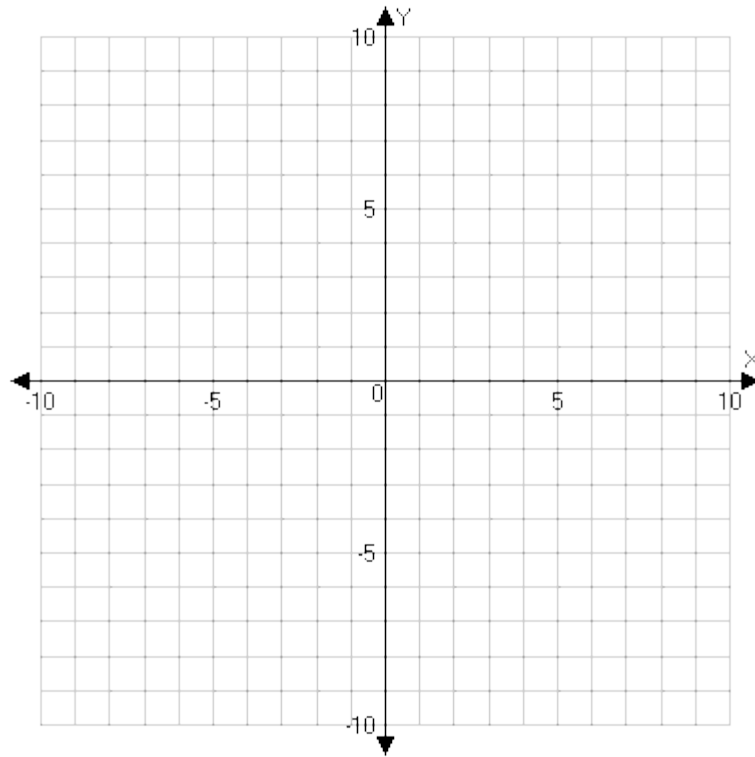
Exercise 4: Sketch the graph of the following logarithmic function by using the transformation techniques.

$$f(x) = -\log_2(x - 3) + 1$$



Exercise 5: Sketch the graph of the following logarithmic function by using the transformation techniques.

$$f(x) = \log(4 - x)$$



Review Exercise Set 8 Answer Key

Exercise 1: Write the given logarithmic expression in its equivalent exponential form using the inverse property $y = \log_b x \iff x = b^y$.

$$\log_4 64 = 3$$

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Exercise 2: Write the given exponential expression in its equivalent logarithmic form using the inverse property $x = b^y \iff y = \log_b x$.

$$8^{-1/3} = \frac{1}{2}$$

$$8^{-1/3} = \frac{1}{2} \iff -\frac{1}{3} = \log_8 \frac{1}{2}$$

Exercise 3: Find the exact value of x in the following logarithmic equation.

$$x = \log_3 243$$

Rewrite 243 in exponential form

$$243 = 3 * 3 * 3 * 3 * 3 = 3^5$$

$$x = \log_3 243$$

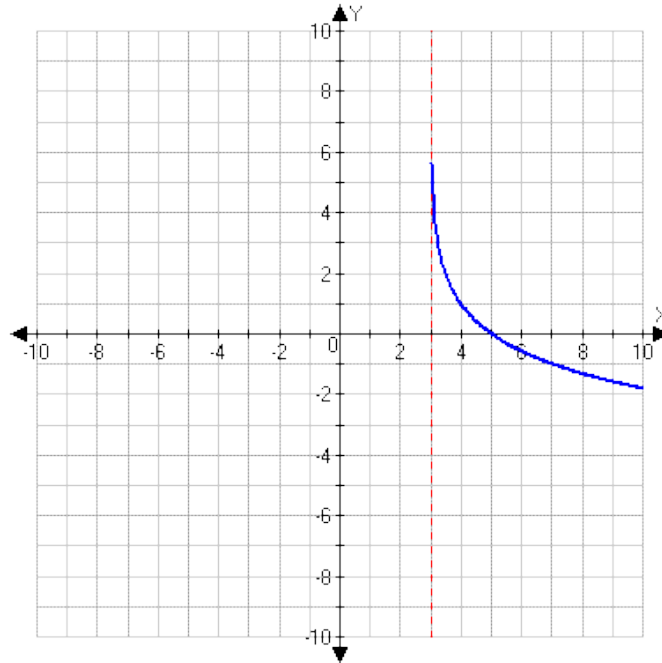
$$x = \log_3 3^5$$

Use properties of logarithms to evaluate the equation

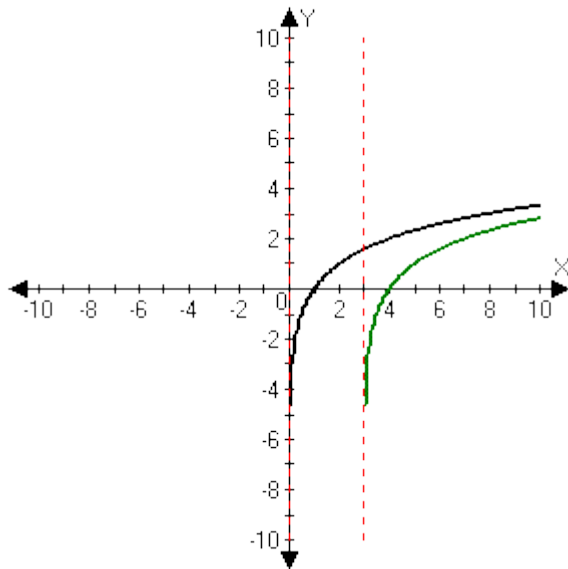
$$x = 5$$

Exercise 4: Sketch the graph of the following logarithmic function by using the transformation techniques.

$$f(x) = -\log_2(x - 3) + 1$$



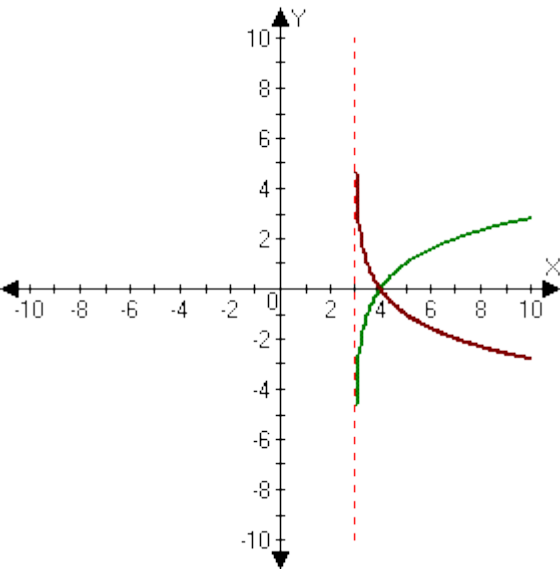
Transformations of $f(x)$



$$f(x) = \log_2 x$$

$$f(x) = \log_2(x - 3)$$

Horizontal shift to the right 3 units



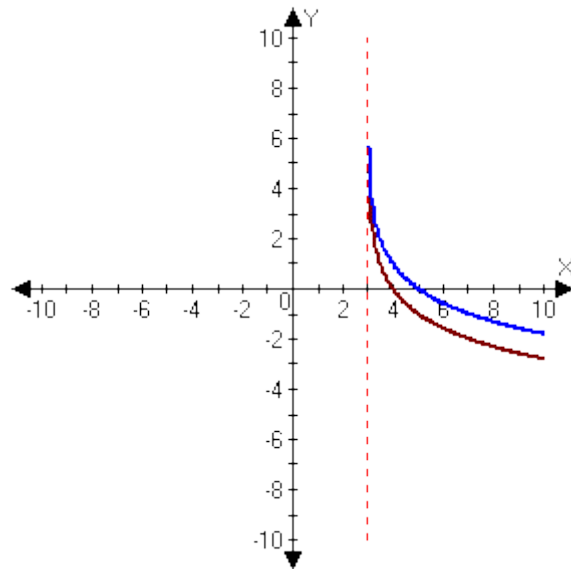
$$f(x) = \log_2(x - 3)$$

$$f(x) = -\log_2(x - 3)$$

Reflection about the x-axis

Exercise 4 (Continued):

Transformations of $f(x)$



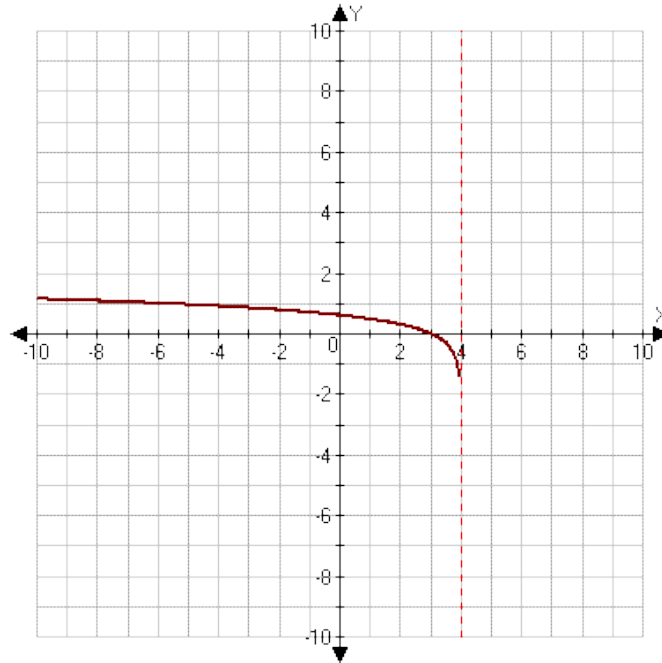
$$f(x) = -\log_2(x - 3)$$

$$f(x) = -\log_2(x - 3) + 1$$

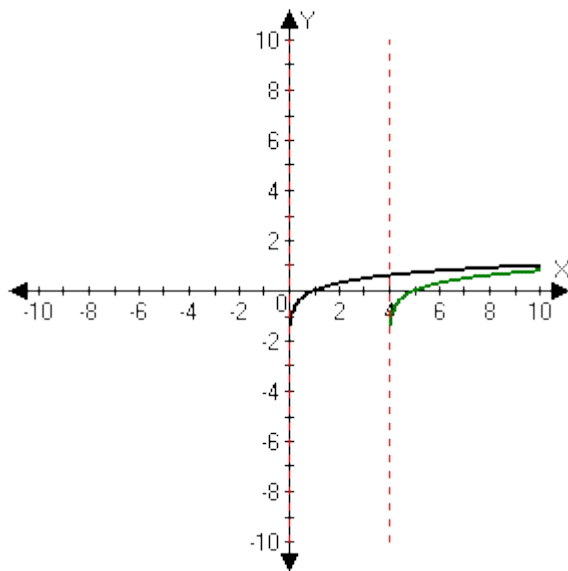
Vertical shift up 1 unit

Exercise 5: Sketch the graph of the following logarithmic function by using the transformation techniques.

$$f(x) = \log(4 - x) = \log -(x - 4)$$



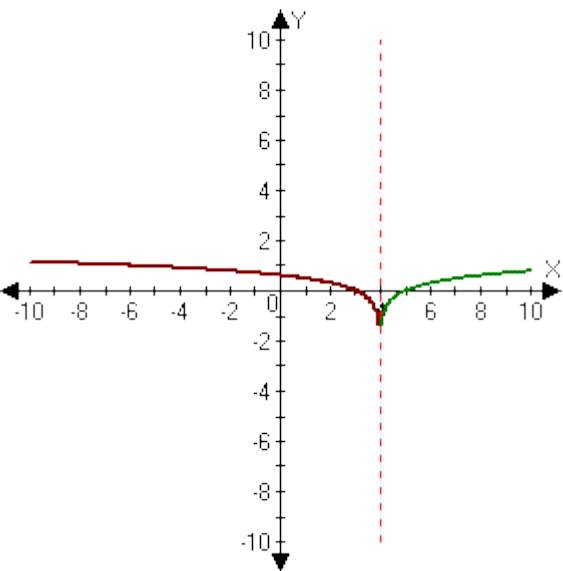
Transformations of $f(x)$



$$f(x) = \log x$$

$$f(x) = \log(x - 4)$$

Horizontal shift to the right 4 units



$$f(x) = \log(x - 4)$$

$$f(x) = \log -(x - 4)$$

Reflection about the vertical asymptote $x = 4$