

## Section 8.2 Extra Practice

1. Describe how the graph of each logarithmic function can be obtained from the graph of  $y = \log_4 x$ .

a)  $y = \log_4 (x + 8) - 1$

b)  $y = \log_4 (-3x)$

c)  $y = -\frac{1}{2} \log (x - 10) + 9$

2. a) Sketch the graph of  $y = \log_2 x$ . Then, apply, in order, the following transformations.

- Stretch horizontally by a factor of 3 about the  $y$ -axis.
- Translate 5 units to the right.

- b) Write the equation of the final transformed image.

3. a) Sketch the graph of  $y = \log_6 x$ . Then, apply, in order, the following transformations.

- Reflect in the  $x$ -axis.
- Translate vertically 2 units down.

- b) Write the equation of the final transformed image.

4. Sketch the graph of each function.

a)  $y = \log_3 (x - 2) + 7$

b)  $y = \log_2 (-(x + 5)) - 3$

c)  $y = 4 \log_5 (2x) + 1$

5. Identify the following characteristics of the graph of each function.

i) the equation of the asymptote

ii) the domain and range

iii) the  $y$ -intercept, to one decimal place if necessary

iv) the  $x$ -intercept, to one decimal place if necessary

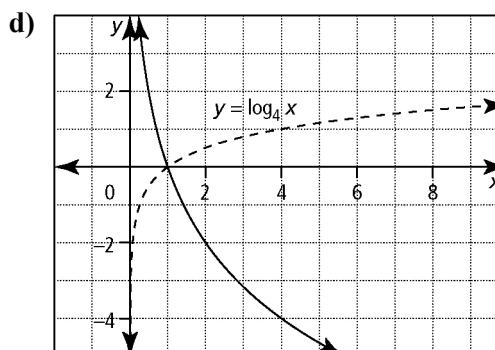
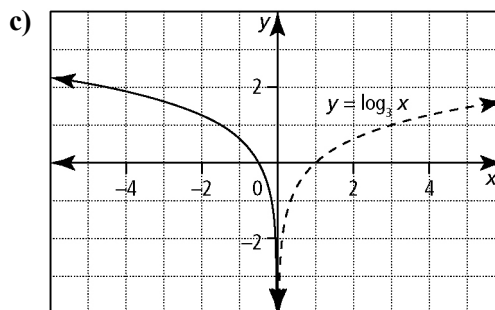
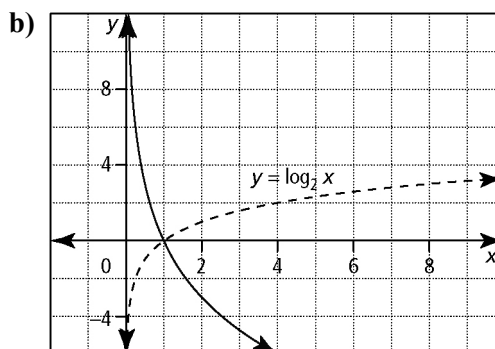
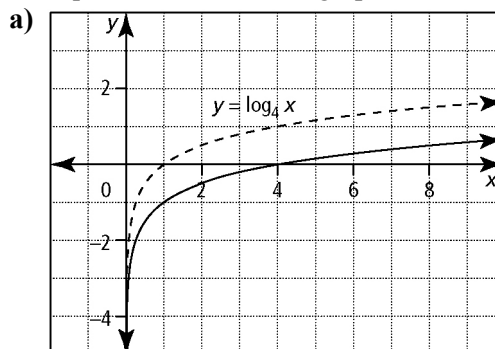
a)  $y = \log_5 (-x) + 3$

b)  $y = 3 \log_2 (2(x - 4))$

c)  $y = -4 \log_7 (x + 2) - 1$

d)  $y = \log \left( \frac{1}{2} (x - 10) \right)$

6. In each graph, the solid curve is a stretch and/or reflection of the dashed curve. Write the equation of each solid graph.



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(continued)

7. Describe, in order, a series of transformations that could be applied to  $y = \log_3 x$  to obtain the graph of each function.
- a)  $y = -2 \log_3 (5(x - 4)) + 7$
  - b)  $y = 0.2 \log_3 (-(x + 1)) - 3$
8. The graph of  $y = \log_2 x$  has been transformed to  $y = a \log_2 (b(x - h)) + k$ . Determine the values of  $a$ ,  $b$ ,  $h$ , and  $k$  for each set of transformations. Write the equation of the transformed function.
- a) a reflection in the  $y$ -axis and a translation 5 units right and 2 units down
  - b) a vertical stretch by a factor of  $\frac{1}{2}$  about the  $x$ -axis and a horizontal stretch about the  $y$ -axis by a factor of 4
  - c) a vertical stretch about the  $x$ -axis by a factor of  $\frac{2}{5}$ , a horizontal stretch about the  $y$ -axis by a factor of  $\frac{1}{3}$ , a reflection in the  $x$ -axis, and a translation of 7 units left and 2 units up
9. Describe how the graph of each logarithmic function can be obtained from the graph of  $y = \log_7 x$ .
- a)  $y = 5 \log_2 (-3x + 15) - 7$
  - b)  $y = 0.25 \log_2 (2 - x) + 5$
  - c)  $2(y - 7) = \log_2 (x + 1)$
10. a) Only a horizontal translation has been applied to the graph of  $y = \log_4 x$  so that the graph of the transformed image passes through the point (6, 2). Determine the equation of the transformed image.
- b) A vertical stretch is applied to the graph of  $y = \log_3 x$  so that the graph of the transformed image passes through the point (2, 12). Determine the equation of the transformed image.

