Section 8.1 Extra Practice

1. Use the definition of a logarithm to evaluate each expression.

  a) $\log_8 64$
  b) $\log 1000$
  c) $\log_2 8$
  d) $\log_3 81$
  e) $\log_7 1$
  f) $\log_4 2$
  g) $\log 0.01$
  h) $\log_4 \sqrt[5]{64}$

2. Express in logarithmic form.

  a) $3^5 = 243$

  b) $16^{\frac{1}{4}} = 2$

  c) $2^{-2} = 0.25$

  d) $5^{2m} = n + 4$

3. Express in exponential form.

  a) $\log_4 64 = 3$

  b) $\log_4 8 = \dfrac{3}{2}$

  c) $\log 10\,000 = 4$

  d) $\log_6 (x - 2) = y$

4. Determine the value of x.

  a) $\log_4 x = 2$
  b) $\log_5 x = -1$
  c) $\log_x 81 = 4$

  d) $\log_4 x = \dfrac{3}{2}$

5. a) Sketch the graph of the exponential function $y = 3^x$.
  b) On the same grid, sketch the graph of the inverse of $y = 3^x$.
 **c)** Explain the relationship between the characteristics of the two functions.

6. a) State the equation of the inverse of $f(x) = \left(\dfrac{1}{3}\right)^x$.

  b) Sketch the graph of the inverse.
  c) Identify the domain, range, and intercepts of the inverse graph.
  d) Determine the equations of any asymptotes.

7. Identify the following characteristics of the inverse graph of each function.

  i) the domain and range
  ii) the x-intercept, if it exists
  iii) the y-intercept, if it exists
  iv) the equation of the asymptote

  a)

  b)
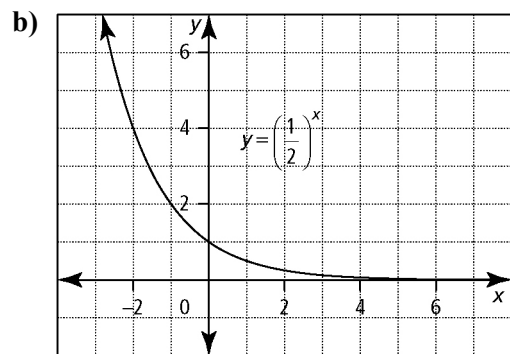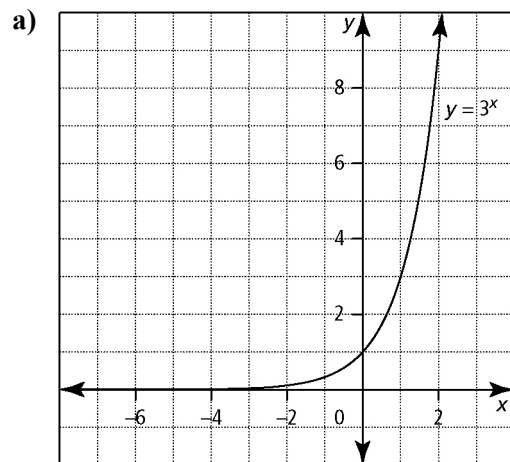
8. Without using technology, estimate the value of each logarithm to one decimal place.

  a) $\log_2 60$
  b) $\log_3 30$
  c) $\log_5 80$
  d) $\log 35$

9. a) Determine the x-intercept of $y = \log_4 (x - 3)$.
  b) Determine the y-intercept of $y = \log_6 x - 5$.

10. The point $\left(\dfrac{1}{16}, -4\right)$ is on the graph of the logarithmic function $f(x) = \log_c x$. The point $(k, 64)$ is on the graph of the inverse, $y = f^{-1}(x)$. Determine the value of k.