

## Chapter 8 Review Extra Practice

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1. Write the equation of the inverse of each exponential function in exponential form and logarithm form.

a)  $y = 4^x$                       c)  $y = (1.2)^x$

b)  $y = \left(\frac{2}{5}\right)^x$                       d)  $y = 0.2^x$

2. Let  $f(x) = \log_{10}(x)$ . For each of the following functions, state the transformations that must be applied to  $f(x)$ .

a)  $g(x) = 4 \log_{10}\left(\frac{1}{2}x\right) + 3$

b)  $g(x) = \frac{2}{5} \log_{10}(-x)$

c)  $g(x) = \log_{10}(3(x + 2)) - \frac{7}{8}$

d)  $g(x) = 3 \log_{10}(6 - x)$

3. Solve for  $x$ .

a)  $\log_2 \frac{1}{256} = x$

b)  $\log_x 32 = -5$

c)  $\log_5 \sqrt[5]{5} = x$

d)  $\log_4 512 = x$

e)  $\log_x 36 = -2$

f)  $\log_x \sqrt{\frac{4}{9}} = \frac{1}{2}$

4. Express the following logarithms in terms of  $\log_3 64$ ,  $\log_3 100$ , and  $\log_3 25$ .

a)  $\log_3(16)$

b)  $\log_3\left(\frac{25}{16}\right)^3$

c)  $\log_3\left(\frac{2500}{16^2}\right)^{\frac{1}{3}}$

d)  $\log_3 \frac{\sqrt{64} \sqrt{2500}}{625}$

5. Solve for  $x$ .

a)  $\left(\frac{2}{3}\right)^{x-1} + \left(\frac{2}{3}\right)^x = \frac{20}{27}$

b)  $2^{x+2} - 2^x = 96$

c)  $4^{x-1} + 4^{x-3} = 272$

d)  $\left(\frac{1}{2}\right)^{x-2} - \left(\frac{1}{2}\right)^x = \frac{3}{32}$

6. Solve each equation for  $x$ .

a)  $\log_2(4x - 3) = \log_2\left(\frac{1}{2}x + 2\right)$

b)  $\log_3(3x) = \log_3(8x - 10)$

c)  $\log_4\left(-\frac{4}{5}x\right) = \log_4\left(-x - \frac{9}{5}\right)$

d)  $\log_{10}(11 - x) = \log_{10}(1 - 2x)$

7. Solve each equation for  $x$ .

a)  $\log x + \log x^2 = 3$

b)  $\log_4 x^2 - \log_4 x = 2$

c)  $\log_{12} x^3 - \log_{12} x^5 = -2$

d)  $\log_3 x^4 + \log_3 x = 5$

8. Solve the following equations for  $n$  using logarithms. Round your answers to 3 decimal places.

a)  $0.32 = (0.78)^n$

b)  $1000 = (1.9)^n$

c)  $300 = \left(\frac{10}{9}\right)^n$

d)  $0.20 = (0.0945)^n$

e)  $20\,000 = (1.42)^n$

f)  $0.12 = (0.976)^n$

9. A town's population grows 2.3% each year. In 2005, its population was 1040.

a) Give an equation that models the town's population for a given year  $n$ .

b) About how many years will it take for the population to reach 20 000 people?

c) In about what year will the population reach 30 000 people?

d) Estimate the rate of change of the population in 2015.

e) Estimate the rate of change of the population in 2025.

f) What is the average rate of change per year of the population from 2005 to 2010?

g) What is the average rate of change per year of the population from 2025 to 2030?