

Review Exercises

See CalcChat.com for tutorial help and worked-out solutions to odd-numbered exercises.

3.1 Evaluating an Exponential Function In Exercises 1–6, evaluate the function at the given value of x . Round your result to three decimal places.

- $f(x) = 0.3^x$, $x = 1.5$
- $f(x) = 30^x$, $x = \sqrt{3}$
- $f(x) = 2^x$, $x = \frac{2}{3}$
- $f(x) = \left(\frac{1}{2}\right)^{2x}$, $x = \pi$
- $f(x) = 7(0.2^x)$, $x = -\sqrt{11}$
- $f(x) = -14(5^x)$, $x = -0.8$

Graphing an Exponential Function In Exercises 7–12, use a graphing utility to construct a table of values for the function. Then sketch the graph of the function.

- $f(x) = 4^{-x} + 4$
- $f(x) = 2.65^{x-1}$
- $f(x) = 5^{x-2} + 4$
- $f(x) = 2^{x-6} - 5$
- $f(x) = \left(\frac{1}{2}\right)^{-x} + 3$
- $f(x) = \left(\frac{1}{8}\right)^{x+2} - 5$

Using a One-to-One Property In Exercises 13–16, use a One-to-One Property to solve the equation for x .

- $\left(\frac{1}{3}\right)^{x-3} = 9$
- $3^{x+3} = \frac{1}{81}$
- $e^{3x-5} = e^7$
- $e^{8-2x} = e^{-3}$

Transforming the Graph of an Exponential Function In Exercises 17–20, describe the transformation of the graph of f that yields the graph of g .

- $f(x) = 5^x$, $g(x) = 5^x + 1$
- $f(x) = 6^x$, $g(x) = 6^{x+1}$
- $f(x) = 3^x$, $g(x) = 1 - 3^x$
- $f(x) = \left(\frac{1}{2}\right)^x$, $g(x) = -\left(\frac{1}{2}\right)^{x+2}$

Evaluating the Natural Exponential Function In Exercises 21–24, evaluate $f(x) = e^x$ at the given value of x . Round your result to three decimal places.

- $x = 3.4$
- $x = -2.5$
- $x = \frac{3}{5}$
- $x = \frac{2}{7}$

Graphing a Natural Exponential Function In Exercises 25–28, use a graphing utility to construct a table of values for the function. Then sketch the graph of the function.

- $h(x) = e^{-x/2}$
- $h(x) = 2 - e^{-x/2}$
- $f(x) = e^{x+2}$
- $s(t) = 4e^{t-1}$

29. Waiting Times The average time between new posts on a message board is 3 minutes. The probability F of waiting less than t minutes until the next post is approximated by the model $F(t) = 1 - e^{-t/3}$. A message has just been posted. Find the probability that the next post will be within (a) 1 minute, (b) 2 minutes, and (c) 5 minutes.

30. Depreciation After t years, the value V of a car that originally cost \$23,970 is given by $V(t) = 23,970\left(\frac{3}{4}\right)^t$.

- Use a graphing utility to graph the function.
- Find the value of the car 2 years after it was purchased.
- According to the model, when does the car depreciate most rapidly? Is this realistic? Explain.
- According to the model, when will the car have no value?

Compound Interest In Exercises 31 and 32, complete the table by finding the balance A when P dollars is invested at rate r for t years and compounded n times per year.

n	1	2	4	12	365	Continuous
A						

- $P = \$5000$, $r = 3\%$, $t = 10$ years
- $P = \$4500$, $r = 2.5\%$, $t = 30$ years

3.2 Writing a Logarithmic Equation In Exercises 33–36, write the exponential equation in logarithmic form. For example, the logarithmic form of $2^3 = 8$ is $\log_2 8 = 3$.

- $3^3 = 27$
- $25^{3/2} = 125$
- $e^{0.8} = 2.2255 \dots$
- $e^0 = 1$

Evaluating a Logarithm In Exercises 37–40, evaluate the logarithm at the given value of x without using a calculator.

- $f(x) = \log x$, $x = 1000$
- $g(x) = \log_9 x$, $x = 3$
- $g(x) = \log_2 x$, $x = \frac{1}{4}$
- $f(x) = \log_3 x$, $x = \frac{1}{81}$

Using a One-to-One Property In Exercises 41–44, use a One-to-One Property to solve the equation for x .

- $\log_4(x + 7) = \log_4 14$
- $\log_8(3x - 10) = \log_8 5$
- $\ln(x + 9) = \ln 4$
- $\log(3x - 2) = \log 7$

Sketching the Graph of a Logarithmic Function In Exercises 45–48, find the domain, x -intercept, and vertical asymptote of the logarithmic function and sketch its graph.

- $g(x) = \log_7 x$
- $f(x) = \log \frac{x}{3}$
- $f(x) = 4 - \log(x + 5)$
- $f(x) = \log(x - 3) + 1$