

**DIRECTIONS:** Write each equation in exponential form.

1.  $\ln 10 = 2.30$

2.  $\ln 50 = 3.91$

3.  $\ln \frac{1}{4} = -1.39$

4.  $\ln \frac{1}{e^3} = -3$

**DIRECTIONS:** Write each equation in logarithmic form.

5.  $e^4 = 54.6$

6.  $e^9 = 8103$

7.  $e^{1/4} = 1.28$

8.  $\sqrt{e} = 1.65$

**DIRECTIONS:** Simplify. If the expression is undefined, say so.

9.  $\ln e^4$

10.  $\ln e^7$

11.  $\ln \frac{1}{e^5}$

12.  $\ln \sqrt{e}$

13.  $\ln 1$

14.  $\ln(-1)$

15.  $e^{\ln 1.2}$

16.  $e^{\ln \sqrt{3}}$

**DIRECTIONS:** Write as a single logarithm.

17.  $\ln 3 + \ln 7$

18.  $\ln 12 - \ln 3$

19.  $\ln 11 + \frac{1}{2} \ln 4$

20.  $3 \ln 3 - \ln 2 + 2$

**DIRECTIONS:** Solve for  $x$ . When necessary, give answers to three decimal places.

21.  $\ln x = 5$

22.  $\ln \frac{1}{x} = 3$

23.  $\ln(x - 2) = 2$

24.  $\ln \sqrt{x + 5} = 1$

**DIRECTIONS:** Solve. Round your answers to the nearest cent.

**25.** You deposit \$2000 in an account that earns 5% annual interest. Find the balance after three years if the interest is compounded...

- a. annually                      b. quarterly                      c. monthly

**26.** If Heather invests \$3500 in a fund that earns 10% annual interest, compounded every six months, how much will she have after 20 years?

**DIRECTIONS:** Solve for  $x$ .

**27.**  $e^{3x} = e^{2x+7}$

**28.**  $e^{2x-1} = e^{3-x}$

**29.**  $10^x = 10^{7-3x}$

**DIRECTIONS:** Solve for  $x$ . When necessary, give answers to three decimal places.

**30.**  $e^x = 5$

**31.**  $e^{2x} = 6$

**32.**  $2^x + 5 = 12$

**DIRECTIONS:** Solve for  $x$ .

**33.**  $\log_2(4x) = \log_2 12$

**34.**  $\log_3(x - 1) = \log_3(2x + 5)$

**35.**  $\ln(x + 3) = \ln(6 - 3x)$

**DIRECTIONS:** Solve for  $x$ . When necessary, give answers to three decimal places.

**36.**  $\ln(5x - 3) = 2$

**37.**  $\ln(3x + 1) = 0$

**38.**  $\log(4x) + 1 = 3$