

## Section 4.6 Practice Master

- Rewrite each power with a positive exponent.
  - $2^{-3}$
  - $4^{-1}$
  - $3^{-2}$
  - $(-4)^{-2}$
  - $-3^{-2}$
  - $(-14)^{-3}$
- Evaluate.
  - $4^{-2}$
  - $3^0$
  - $10^{-4}$
  - $(-3)^{-2}$
  - $-8^{-2}$
  - $-7^0$
  - $\left(\frac{1}{3}\right)^{-3}$
  - $\left(-\frac{3}{7}\right)^{-2}$
- Evaluate.
  - $3^4 + 3^{-1}$
  - $2^0 - 2^{-2}$
  - $(3 + 2)^0$
  - $9 + 9^{-2} + 9^0$
- Determine the value of  $x$  that makes each statement true.
  - $x^{-4} = \frac{1}{16}$
  - $\left(\frac{1}{3}\right)^x = \frac{1}{81}$
  - $\left(\frac{3}{4}\right)^x = \frac{64}{27}$
  - $5^x = \frac{1}{25}$
- The half-life of radon-222 is 4 days. Determine the remaining mass of 300 mg of radon-222 after
  - 8 days
  - 12 days
  - 20 days
- A culture of bacteria in a biology lab contains 2000 bacteria cells. The number of cells in the culture doubles every day. This can be expressed by the equation  $N = 2000 \times 2^t$ , where  $N$  represents the number of bacteria cells and  $t$  represents the time, in days.
  - Find the number of cells in the culture after 2 days and after 1 week.
  - How many cells were in the culture 2 days ago? Hint: 2 days ago means  $t = -2$ .
  - What does  $t = 0$  indicate?
- The number,  $N$ , of radium atoms remaining in a sample that started at 400 atoms can be represented by the equation  $N = 400 \times 2^{\frac{-t}{1600}}$ , where  $t$  is the time, in years.
  - What is the half-life of radium?
  - How many atoms are left after 3200 years?
  - What does  $t = 0$  represent?
  - What do negative values of  $t$  represent?
- The half-life of beryllium-11 is 13.81 s. Determine the remaining mass of 3200 g of beryllium-11 after
  - 27.62 s
  - 41.43 s
  - 55.24 s