

Section 4.6 Practice Master

1. Rewrite each power with a positive exponent.
a) 2^{-3} b) 4^{-1} c) 3^{-2}
d) $(-4)^{-2}$ e) -3^{-2} f) $(-14)^{-3}$
2. Evaluate.
a) 4^{-2} b) 3^0
c) 10^{-4} d) $(-3)^{-2}$
e) -8^{-2} f) -7^0
g) $\left(\frac{1}{3}\right)^{-3}$ h) $\left(-\frac{3}{7}\right)^{-2}$
3. Evaluate.
a) $3^4 + 3^{-1}$ b) $2^0 - 2^{-2}$
c) $(3 + 2)^0$ d) $9 + 9^{-2} + 9^0$
4. Determine the value of x that makes each statement true.
a) $x^{-4} = \frac{1}{16}$ b) $\left(\frac{1}{3}\right)^x = \frac{1}{81}$
c) $\left(\frac{3}{4}\right)^x = \frac{64}{27}$ d) $5^x = \frac{1}{25}$
5. The half-life of radon-222 is 4 days.
Determine the remaining mass of 300 mg of radon-222 after
a) 8 days
b) 12 days
c) 20 days
6. 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.
a) Find the number of cells in the culture after 2 days and after 1 week.
b) How many cells were in the culture 2 days ago? Hint: 2 days ago means $t = -2$.
c) What does $t = 0$ indicate?
7. 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.
a) What is the half-life of radium?
b) How many atoms are left after 3200 years?
c) What does $t = 0$ represent?
d) What do negative values of t represent?
8. The half-life of beryllium-11 is 13.81 s.
Determine the remaining mass of 3200 g of beryllium-11 after
a) 27.62 s
b) 41.43 s
c) 55.24 s