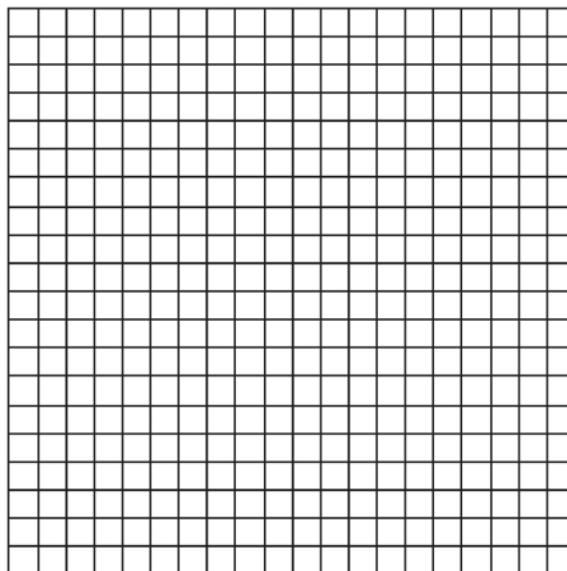


A2.A.6: Exponential Decay: Solve an application which results in an exponential function

- 1 Depreciation (the decline in cash value) on a car can be determined by the formula $V = C(1 - r)^t$, where V is the value of the car after t years, C is the original cost, and r is the rate of depreciation. If a car's cost, when new, is \$15,000, the rate of depreciation is 30%, and the value of the car now is \$3,000, how old is the car to the *nearest tenth of a year*?
- 2 The equation for radioactive decay is $p = (0.5)^{\frac{t}{H}}$, where p is the part of a substance with half-life H remaining radioactive after a period of time, t . A given substance has a half-life of 6,000 years. After t years, one-fifth of the original sample remains radioactive. Find t , to the *nearest thousand years*.
- 3 An archaeologist can determine the approximate age of certain ancient specimens by measuring the amount of carbon-14, a radioactive substance, contained in the specimen. The formula used to determine the age of a specimen is $A = A_0 2^{\frac{-t}{5760}}$, where A is the amount of carbon-14 that a specimen contains, A_0 is the original amount of carbon-14, t is time, in years, and 5760 is the half-life of carbon-14. A specimen that originally contained 120 milligrams of carbon-14 now contains 100 milligrams of this substance. What is the age of the specimen, to the *nearest hundred years*?
- 4 The amount A , in milligrams, of a 10-milligram dose of a drug remaining in the body after t hours is given by the formula $A = 10(0.8)^t$. Find, to the *nearest tenth of an hour*, how long it takes for half of the drug dose to be left in the body.
- 5 The current population of Little Pond, New York, is 20,000. The population is *decreasing*, as represented by the formula $P = A(1.3)^{-0.234t}$, where P = final population, t = time, in years, and A = initial population. What will the population be 3 years from now? Round your answer to the *nearest hundred people*. To the *nearest tenth of a year*, how many years will it take for the population to reach half the present population? [The use of the grid is optional.]



A2.A.6: Exponential Decay: Solve an application which results in an exponential function
Answer Section

1 ANS:
4.5

PTS: 4 REF: 010230b

2 ANS:
14,000

PTS: 4 REF: 010429b

3 ANS:
1,500

PTS: 4 REF: 060431b

4 ANS:
3.1

PTS: 4 REF: 080132b

5 ANS:
16,600, 11.3

PTS: 4 REF: 010632b