

Percent of Exponential Growth and Decay

Name _____ ANSWERS

Directions: Round answers to *nearest integer* unless the problem dictates otherwise.

- A flu outbreak hits an elementary school on Monday, with an initial number of 20 ill students coming to school. The number of ill students then increases by 25% per hour.
 - Is this situation an example of exponential growth or exponential decay? **Growth**
 - Write an exponential function to model this Monday flu outbreak. $y = 20(1 + 0.25)^x$
 - How many students will be ill after 6 hours? **76**
- A total of 50,000 contestants participate in an internet on-line survivor game. The game randomly kills off 20% of the contestants each day.
 - Is this situation an example of exponential growth or exponential decay? **decay**
 - Write an exponential function to model this game. $y = 50000(0.8)^x$
 - How many contestants are left in the game at the end of one week? **10,485**
- A new sports car sells for \$35,000. The value of the car decreases by 18% annually. Write an exponential function to model the depreciation on this car. $y = 35000(0.82)^x$
- At the end of last year, the population of a small town was approximately 75,000 people. The population is growing at the rate of 2.4% each year. In how many years will the population reach 100,000 people? $y = 75000(1.024)^x$ **In 13 years.**
- Iodine-131 is a radioactive isotope used in the treatment of thyroid conditions. It has a half-life of 8 days. Half-life is the amount of time it takes for half of the substance to decay (disappear). If a patient is given 20 mg of iodine-131, how much of the substance (rounded to the *nearest hundredth*) will remain in the body after 32 days? **1.25 mg**
- Geometric sequences are created by multiplying the prior term by a constant value, called the common ratio. This common multiplication occurring at each step can be viewed as a "growth factor", similar to what can be seen in exponential growth.

3, 9, 27, 81, 243, ...

Geometric sequences demonstrate exponential growth.

Write an exponential function to model this sequence. $y = 3^x$