

F.LE.B.5: Modeling Exponential Functions 1

- 1 Some banks charge a fee on savings accounts that are left inactive for an extended period of time.
The equation $y = 5000(0.98)^x$ represents the value, y , of one account that was left inactive for a period of x years. What is the y -intercept of this equation and what does it represent?
 - 1) 0.98, the percent of money in the account initially
 - 2) 0.98, the percent of money in the account after x years
 - 3) 5000, the amount of money in the account initially
 - 4) 5000, the amount of money in the account after x years
- 2 The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is
 - 1) 17%
 - 2) 1.7%
 - 3) 1.017%
 - 4) 0.017%
- 3 The equation $A = 1300(1.02)^7$ is being used to calculate the amount of money in a savings account. What does 1.02 represent in this equation?
 - 1) 0.02% decay
 - 2) 0.02% growth
 - 3) 2% decay
 - 4) 2% growth
- 4 Milton has his money invested in a stock portfolio. The value, $v(x)$, of his portfolio can be modeled with the function $v(x) = 30,000(0.78)^x$, where x is the number of years since he made his investment. Which statement describes the rate of change of the value of his portfolio?
 - 1) It decreases 78% per year.
 - 2) It decreases 22% per year.
 - 3) It increases 78% per year.
 - 4) It increases 22% per year.
- 5 Is the equation $A = 21000(1 - 0.12)^t$ a model of exponential growth or exponential decay, and what is the rate (percent) of change per time period?
 - 1) exponential growth and 12%
 - 2) exponential growth and 88%
 - 3) exponential decay and 12%
 - 4) exponential decay and 88%
- 6 The 2014 winner of the Boston Marathon runs as many as 120 miles per week. During the last few weeks of his training for an event, his mileage can be modeled by $M(w) = 120(.90)^{w-1}$, where w represents the number of weeks since training began. Which statement is true about the model $M(w)$?
 - 1) The number of miles he runs will increase by 90% each week.
 - 2) The number of miles he runs will be 10% of the previous week.
 - 3) $M(w)$ represents the total mileage run in a given week.
 - 4) w represents the number of weeks left until his marathon.
- 7 The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered. What is the percent of change each year? Explain how you arrived at your answer.
- 8 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.
- 9 The breakdown of a sample of a chemical compound is represented by the function $p(t) = 300(0.5)^t$, where $p(t)$ represents the number of milligrams of the substance and t represents the time, in years. In the function $p(t)$, explain what 0.5 and 300 represent.

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Answer Section

1 ANS: 3 REF: 011515ai

2 ANS: 2 REF: 061517ai

3 ANS: 4 REF: 011608ai

4 ANS: 2 REF: 081624ai

5 ANS: 3 REF: 081211ia

6 ANS: 3 REF: 011724ai

7 ANS:

$1 - 0.95 = 0.05 = 5%$ To find the rate of change of an equation in the form $y = ab^x$, subtract b from 1.

REF: 081530ai

8 ANS:

$1 - 0.85 = 0.15 = 15%$ To find the rate of change of an equation in the form $y = ab^x$, subtract b from 1.

REF: 061728ai

9 ANS:

0.5 represents the rate of decay and 300 represents the initial amount of the compound.

REF: 061426ai