

Interpreting Exponential Equations

1. $v = (500)(1.03)^t$

The given equation models the value of antique lamps t years after restoration, where $0 \leq t \leq 8$. What is the best interpretation of the number 1.03 in this context?

- A) On average, the value of the lamp increased by 0.03 dollars per year.
- B) On average, the value of the lamp increased by 1.03 dollars per year.
- C) On average, the value of the lamp increased by 1.03% per year.
- D) On average, the value of the lamp increased by 3% per year.

2. $f(x) = 53.109(1.054)^x$

A nation's vehicle production, in thousands of vehicles, from the years 1850 to 1900 can be modeled by the function f , where x is the number of years after 1850. Which of the following is the best interpretation of the number 1.054 in this context?

- A) On average, the production of vehicles increased by approximately 0.054 thousand vehicles per year.
- B) On average, the production of vehicles increased by approximately 1.054 thousand vehicles per year.
- C) On average, the production of vehicles increased by approximately 5.4% per year.
- D) On average, the production of vehicles increased by approximately 105.4% per year.

3. The resale value of a motorcycle can be modeled by a decreasing exponential function of time. Which of the following scenarios could describe how the value of the motorcycle changes over time?

- A) Each month, the value decreases by \$100.
- B) Each year, the value decreases by \$100.
- C) Each year, the value decreases by 10% of the prior year's value.
- D) Each year, the value decrease by 10% of the original value.

4. $C = 6.2(1.028)^t$

The equation above models the cost C , in cents, of a piece of gum t years after 1890, where $0 \leq t \leq 80$. What is the best interpretation of the value of 6.2 in this context?

- A) The model estimates that the cost of a piece of gum was 6.8 cents in 1890.
- B) The model estimates that the cost of a piece of gum was 6.8 cents in 1970.
- C) The model estimates that the cost of a piece of gum increased by 6.8 cents each year from 1890 to 1970.
- D) The model estimates that the cost of a piece of gum increased by 6.8% each year from 1890 to 1970.

5. $f(x) = 1.09(1.019)^x$

A nation's French fry production, in millions of pounds, from the years 1950 to 2020 can be modeled by the function f , where x is the number of years after 1950. Which of the following is the best interpretation of the number 1.019 in this context?

- A) On average, the production of French fries increased by approximately 0.019 million pounds per year.
- B) On average, the production of French fries increased by approximately 1.019 million pounds per year.
- C) On average, the production of French fries increased by approximately 1.9% per year.
- D) On average, the production of French fries increased by approximately 101.9% per year.

6. Which of the following situations is best modeled by an exponential function?

- A) Each year, the number of people visiting a national park increases by 10% of the number of people visiting the parks the preceding year.
- B) Each year, the number of people visiting a national park increases by 10% of the original number of people visiting the parks.
- C) The number of people visiting a national park is 10 more each year compared to the preceding year.
- D) The number of people visiting a national park increases by 20 people each year.

7. Which of the following situations is best modeled by an exponential function?
- A) Each year, the number of people traveling by horse-drawn carriages decreases by 35% of the original number of people traveling by horse-drawn carriages.
 - B) Each year, the number of people traveling by horse-drawn carriages decreases by 35% of the number of people traveling by horse-drawn carriages the preceding year.
 - C) The number of people the number of people traveling by horse-drawn carriages is 35 fewer each year compared to the preceding year.
 - D) The number of people traveling by horse-drawn carriages decreases by 35 people each year.

8.
$$h = (3000)(0.93)^t$$

The given equation models the value of computers t years after initial purchase, where $0 \leq t \leq 15$. What is the best interpretation of the number 0.93 in this context?

- A) On average, the value of computers decreased by 0.93 dollars per year
- B) On average, the value of the computers decreased by 0.07 dollars per year
- C) On average, the value of the computers decreased by 93% per year.
- D) On average, the value of the computers decreased by 7% per year.

9. The given function $f(t) = 24(2)^{\frac{t}{13}}$ models the number of bacteria in a petri dish, where t represents the time, in hours, and $t \leq 500$. Which of the following is the best interpretation of the number 24 in this context?
- A) There are exactly 2 bacteria in the petri dish at time $t = 24$.
 - B) There are 24 bacteria in the petri dish at time $t = 0$.
 - C) The number of bacteria in the petri dish increases by 24 every 13 minutes.
 - D) There are 0 bacteria in the petri dish at $t = 0$.

10. The function $f(t) = 61\left(\frac{1}{2}\right)^{\frac{t}{32}}$ models the number of radioactive atoms in a sample, where t represents the time, in days, and $t \leq 150$. Which of the following is the best interpretation of the number 61 in this context?
- A) There are exactly 32 radioactive atoms in the sample at time $t = 61$.
 - B) There are 61 radioactive atoms in the sample at time $t = 0$.
 - C) The number of radioactive atoms in the sample decreases by 61 every 35 minutes.
 - D) There are 0 radioactive atoms in the sample dish at $t = 61$.