Date Completed: _____
Mentor Initials: _____

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 6.2 cents in 1890.
B) The model estimates that the cost of a piece of gum was 6.2 cents in 1970.
C) The model estimates that the cost of a piece of gum increased by 6.2 cents each year from 1890 to 1970.
D) The model estimates that the cost of a piece of gum increased by 6.2% 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 $t = 61$.