

TEST NAME: **F-LE.5**  
TEST ID: **385689**  
GRADE: **09**  
SUBJECT: **Mathematics**  
TEST CATEGORY: **My Classroom**

Student: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

1. Albert invests money in an account that earns a yearly dividend. The amount,  $A$ , in his account at the end of  $t$  years is given by the equation  $A = \$2,400 + \$144t$ . Which statement is correct?

- A. \$2,544 represents the total amount at the end of  $t$  years.
- B. \$2,400 represents the total amount at the end of  $t$  years.
- C. \$2,400 represents the dividend earned every year.
- D. \$144 represents the dividend earned every year.

2. In the equation relating Fahrenheit ( $F$ ) and Celsius ( $C$ ) temperature,  $F = \frac{9}{5}C + 32$ , what is the interpretation of the coefficient of  $C$ ?

- A. It is the ratio of any Fahrenheit temperature to the corresponding Celsius temperature.
- B. It is the ratio of any Celsius temperature to the corresponding Fahrenheit temperature.
- C. As the Fahrenheit temperature increases by  $5^\circ$ , the Celsius temperature increases by  $9^\circ$ .
- D. As the Fahrenheit temperature increases by  $9^\circ$ , the Celsius temperature increases by  $5^\circ$ .

3. Avery and her friends attend a museum. It costs \$5 to enter the main exhibit hall, with an added charge of \$3 to view each special exhibit. Avery writes an equation that models the total price of visiting the museum as a function of the number of special exhibits they view.

What is the slope and  $y$ -intercept of Avery's model?

- A.  $y$ -intercept = 0, slope =  $-2$
- B.  $y$ -intercept = 0, slope = 3
- C.  $y$ -intercept = 5, slope = 3
- D.  $y$ -intercept = 5, slope = 8

4. Each year, a basketball league organizes a tournament. The number of teams,  $T$ , left after  $n$  rounds can be modeled by the equation  $T = 8(0.5)^n$ .

Which function can be used to find the number of teams left after  $n$  rounds if eight additional teams participate in the tournament and the proportion of teams eliminated after each round remains the same?

- A.  $f(n) = 16(0.5)^n$
- B.  $f(n) = 16(0.5)^n + 8$
- C.  $f(n) = 8(0.5)^n + 8$
- D.  $f(n) = 8(0.5)^{8n}$

5. After traveling a while, Karen begins to keep track of her time and mileage. In the equation  $d = 50t + 40$ ,  $d$  represents the total distance traveled in miles, and  $t$  represents the time in hours. How far had Karen traveled before she began keeping track of her mileage?

- A. 90 miles
- B. 50 miles
- C. 40 miles
- D. 10 miles

6. An arithmetic sequence is defined as follows:

$$a_0 = 2$$

$$a_n = a_{[n-1]} - 9$$

A student draws a graph with points at  $(n, a_n)$  for all values of  $n$ . What is the slope of the graph?

- A.  $-9$
- B.  $-\frac{1}{9}$
- C.  $\frac{2}{9}$
- D.  $9$

7. The decline in the annual fuel consumption in million gallons,  $F$ , of a domestic airline since 2000 is modeled by the function  $F = 13903(2)^{-0.019t}$ , where  $t$  represents the number of years. How many millions of gallons of fuel were consumed by the airline in 2000?
- A. 2
  - B. 38
  - C. 13,903
  - D. 27,806

8. In the graph below,  $y$  is the total pay an employee earns for working  $x$  hours.



Which equation indicates an hourly salary that is one and a half times as much as the amount shown in the graph?

- A.  $y = 5x$
- B.  $y = 15x$
- C.  $y = 8x + 15$
- D.  $y = 10x + 5$

9. The value of Jim's car,  $v(t)$ , after  $t$  years can be modeled by the function  $v(t) = 10,000(0.91)^t$ .

Part A. What do the values of 10,000 and 0.91 represent in terms of the context?

Part B. Can the value of  $t$  ever be negative or 0? Explain why or why not.

Use words, numbers, and/or pictures to show your work.

10. Maria wants to rent a car. She learns that the total daily cost is calculated using the formula  $C = 0.5x + 30$ , where  $x$  is the number of miles driven that day. What does the constant term in this formula represent?
- A. number of miles the car has been driven
  - B. rental cost with 30 miles driven
  - C. rental cost with 0 miles driven
  - D. cost per mile driven
11. The math club is selling silk-screened T-shirts as a fundraiser. The T-shirt company charges a one-time set-up fee of \$125.00 for the artwork and \$0.50 to screen each T-shirt. Undecorated shirts cost \$5.00 each. Which equation models the cost ( $C$ ) of  $x$  number of silk-screened T-shirts?
- A.  $C = 125 + 0.5x$
  - B.  $C = 125 - 5x$
  - C.  $C = 125 + 5.5x$
  - D.  $C = 125x + 5.5$

12. The size of a population of gorillas can be modeled by the function  $P = 18(1.2)^t$ , where  $t$  is the number of years since 2005. What does 18 represent in this function?
- A. the number of years since 2005
  - B. the size of the population of gorillas in 2005
  - C. the growth rate of the gorilla population since 2005
  - D. the number of gorillas that have been added since 2005
13. The amount of money Keith has saved toward the purchase of a car,  $T$  dollars, is given by the equation  $T = 75n + 300$ , where  $n$  is the number of weeks Keith has saved a fixed amount of money per week. What does 300 represent with respect to the context?
- A. beginning amount of money
  - B. amount of money saved per week
  - C. amount of money still needed to be saved
  - D. amount of money saved at the end of week  $n$
14. A pizza restaurant charges a flat fee for a plain cheese pizza. There is an extra charge for any additional toppings. The cost of a pizza can be determined from the equation  $C = 0.5m + 5$ , where  $m$  is the number of additional toppings and  $C$  is the cost of the pizza ordered. What are the interpretations of slope and  $y$ -intercept in the equation?
- A. slope: cost per additional topping  
y-intercept: cost of the plain pizza
  - B. slope: cost per additional topping  
y-intercept: cost of the first topping
  - C. slope: cost of the plain pizza  
y-intercept: cost per additional topping
  - D. slope: ratio of cost of additional topping to the cost of the plain pizza  
y-intercept: cost of an additional topping
15. The function  $f(x) = 37x + 20$  models the total cost for Rachel to be a member at a gym for  $x$  months. What can be interpreted from the  $y$ -intercept of the function?
- A. Rachel must pay \$37 per month to use the gym.
  - B. Rachel must pay \$20 per month to use the gym.
  - C. Rachel must pay a \$37 membership fee to join the gym.
  - D. Rachel must pay a \$20 membership fee to join the gym.

16. The function  $V(t) = 30,000 - 2,900t$  models the value of a car  $t$  years after it was purchased. What is the meaning of the coefficient of  $t$ ?
- A. the value of the car when it was purchased
  - B. the total change in the value of the car  $x$  years after it was purchased
  - C. the amount the value of the car decreases each year after it is purchased
  - D. the amount the value of the car increases each year after it is purchased

17. A geometric sequence,  $s$ , begins  $4, 7, 12\frac{1}{4}, \dots$

If the points  $(n, s_n)$  are graphed, they sketch an exponential function  $y = a \cdot b^n$ . In this case, which of the following is closest to  $b$ ?

- A.  $\frac{4}{7}$
  - B.  $1\frac{3}{4}$
  - C. 3
  - D. 4
18. A research laboratory studied the decay rate of two radioactive elements,  $A$  and  $B$ . The amount of element  $A$  present after  $t$  days is modeled by  $A = 10(1 - 0.12)^t$ , and the amount of element  $B$  after the same number of days is modeled by  $B = 20(0.88)^t$ . Which conclusion is **correct** based on the study?
- A. The ratio of the amounts of element  $A$  to element  $B$  that remain after time,  $t$ , is 2:1.
  - B. The initial amount of element  $A$  is twice the initial amount of element  $B$ .
  - C. Element  $A$ 's decay rate is 12% while element  $B$ 's decay rate is 88%.
  - D. Both elements have the same decay rate.

19. Bill earns a salary of \$300 each week and an additional commission of 2% on his total sales that week.

**Part A.** Write a function that shows the relationship between  $x$ , Bill's total weekly sales, in dollars, and his total weekly income,  $P(x)$ , in dollars.

**Part B.** Identify and explain what the slope and  $y$ -intercept mean in terms of this scenario.

**Part C.** Calculate the total amount of weekly sales Bill needs to make to earn a weekly income of \$600.

20. The *doubling period*,  $d$ , of an exponential function  $f(x) = a \cdot b^x$  is the value of  $x$  such that  $f(d) = 2 \cdot f(0)$ . To the nearest 0.1, what is the doubling period of  $f(x) = 0.7 \cdot 1.22^x$  ?

- A. 1.6
- B. 3.5
- C. 5.3
- D. 9.1

21. A student observed the change in the number of microorganisms in the population,  $P$ , of a sample of algae in the lab. The student models the change using the equation  $P = 220e^{0.057t}$ , where  $t$  represents the time in days. What does 0.057 in the equation represent?

- A. a decay rate of 5.7% per day
- B. a growth rate of 5.7% per day
- C. a decay rate of 0.057% per day
- D. a growth rate of 0.057% per day

22. The function  $C(x) = 0.05x + 49.95$  models Shelly's total monthly phone bill when she talks for  $x$  minutes in the month. What does the constant term of the function represent?

- A. the total monthly cost
- B. the fixed monthly rate
- C. the number of minutes used
- D. the cost per minute of a phone call



23. Suppose that the equation  $y = 2.26x + 14.3$  can be used to represent the percent of U. S. population enrolled in an insurance health maintenance organization (HMO)  $x$  years since 1992. What does the coefficient of  $x$  represent?
- A. The percent of the U. S. population that joins an HMO each year.
  - B. The percent of the U. S. population that drops an HMO each year.
  - C. The percent of the U. S. population that has no insurance coverage.
  - D. The percent of the U. S. population that uses an HMO for insurance coverage.
24. To calculate the charge for a load of bricks, including delivery, the Pine Ridge Brick Company uses the function  $c = 0.42b + 25$ , where  $c$  is the charge and  $b$  is the number of bricks. What is the meaning of the coefficient of  $b$ ?
- A. the delivery charge per load
  - B. the total delivery charge
  - C. the total cost of the bricks
  - D. the cost per brick
25. A taxi company uses the function  $f(x) = 0.45x + 3.50$  to determine the cost to take a taxi  $x$  miles. What is the meaning of the coefficient of  $x$ ?
- A. the cost per mile
  - B. the number of miles
  - C. the total cost to ride a taxi
  - D. the fixed fee the company charges
26. The equation,  $y = 3,900x + 80,000$  models the change in average house prices,  $y$ , in a city  $x$  years since 2008. The slope of the line represents which value?
- A. the average price of a house in 2008
  - B. the total change in average price of a house since 2008
  - C. the increase in average price of a house between two consecutive years
  - D. the decrease in average price of a house between two consecutive years

27. The function  $f(t) = 500(0.8)^t$  models the the size of a population of rats in an area  $t$  years after 2005. What does 0.8 represent in this function?
- A. a decay rate of 80% each year
  - B. a growth rate of 80% each year
  - C. a decay rate of 20% each year
  - D. a growth rate of 20% each year
28. Water freezes at  $0^\circ\text{C}$ . In the equation relating Fahrenheit and Celsius,  $F = \frac{5}{9}C + 32$ , what does the constant term represent?
- A. the difference between the Fahrenheit and Celsius values at any temperature
  - B. the factor by which the Fahrenheit and Celsius temperatures differ
  - C. the ratio between the Fahrenheit and Celsius temperatures
  - D. the freezing temperature of water in  $^\circ\text{F}$
29. The function  $f(x) = 2x + 4$  models the amount of money Kayla charges per hour to babysit  $x$  children. What is the meaning of the slope of the function?
- A. the fixed rate Kayla charges
  - B. the amount Kayla charges per child
  - C. the amount Kayla charges per hour
  - D. the cost for Kayla to babysit 0 children
30. The value of a new car after  $n$  years is modeled by the function  $f(n) = 21,500(0.95)^n$ . What does the number 21,500 represent in terms of the given context?
31. The function  $f(n) = 1000(0.95)^n$  represents the population of bacteria in a lab after  $n$  hours. Write an inequality that represents the possible population values of this bacteria.

32. A lawn service company uses the function  $f(x) = 2.5x + 25$  to determine the cost for  $x$  hours of service. What does the constant term in the equation represent?
- A. the total number of hours of lawn service provided
  - B. the initial fee the company charges before providing lawn service
  - C. the total cost for the lawn service
  - D. the cost per hour of lawn service
33. Robin invests \$3,210 in an account that is compounded annually and pays an interest of 3.4% each year. By what factor is the investment increasing every year?
- A. 944.11
  - B. 109.14
  - C. 1.034
  - D. 0.966
34. The equation  $y = 250(1.05)^x$  models the value of an investment after  $x$  years. Which statement is true about the value of the investment?
- A. The value of the investment is growing by \$250 each year.
  - B. The value of the investment is growing by 5% each year.
  - C. The value of the investment is decreasing by \$250 each year.
  - D. The value of the investment is decreasing by 5% each year.
35. Carlos has a sales job that pays a base salary plus a commission on the total amount of his sales. The amount of money he earns in any paycheck can be determined by the function  $T(s) = 0.03s + b$ , where  $T(s)$  is his total paycheck,  $s$  is the amount of his sales, and  $b$  is the base pay.
- Part A: Explain the slope of the function in the context of how much Carlos earns.
- Part B: The ordered pair  $(2500, 450)$  is a solution to this function. Determine the base pay that Carlos earns. Show your work.
- Part C: If Carlos has a sales total of \$4750, what will be the total amount of his paycheck? Show your work.
- Part D: Carlos receives a raise in his base pay. If his total earnings for \$3700 in sales is \$491, by how much was his base pay increased? Show your work.

36. The function  $V(t) = 22,000 - 3,400t$  models the value of the Mr. Smith's boat  $t$  years after he purchased it in 2009. What does the 22,000 represent?
- A. the current value of the boat
  - B. the value of the boat when Mr. Smith purchased it
  - C. the amount the value of the boat increases each year Mr. Smith owns it
  - D. the amount the value of the boat decreases each year Mr. Smith owns it