

Name: _____ Date: _____

1. A function is called linear if it has a(n) _____ growth rate.
 - A) increasing
 - B) decreasing
 - C) varied
 - D) constant
2. In the linear function $y = mx + b$, b is the _____.
 - A) growth rate
 - B) slope
 - C) initial value
 - D) balance
3. Given a set of data points, the _____ line is a line that comes as close as possible to fitting those data.
 - A) interpretation
 - B) regression
 - C) stabilizing
 - D) growth
4. Suppose you wrote 250 words of a sociology paper yesterday and today began typing at a rate of 40 words per minute. Then the total number of words typed is a linear function of the number of minutes since you began typing today.
 - A) True
 - B) False
5. If we drop a rock near the surface of Earth, its velocity increases by 32 feet per second for each second the rock falls. If v is the velocity in feet per second and t is the time in seconds, then the velocity of the falling rock is a linear function of time and the linear formula for this relationship would be:
 - A) $v = 32t$
 - B) $t = 32v$
 - C) $v = t + 32$
 - D) $t = v + 32$

6. Suppose you are at the base of a hill and see a sign that reads "Elevation 4000 Feet." The road you are on goes straight up the hill to the top, where you see another sign that reads "Elevation 4500 Feet." If the top of the hill is 5 horizontal miles from the base, what is the growth rate in your elevation with respect to horizontal distance as you drive up the road?
- A) 150 ft/mile
 - B) 100 ft/mile
 - C) 200 ft/mile
 - D) 500 ft/mile
7. The growth rate of the speed of sound in relation to the temperature in degrees Fahrenheit is a linear function. The speed of sound at 0 degrees Fahrenheit is 1052.3 feet per second. For every 1 degree Fahrenheit rise in temperature, the speed of sound increases by 1.1 feet per second. Identify the slope of the linear function that gives the speed of sound in terms of temperature.
- A) 1.0 ft per second per degree
 - B) 1.1 ft per second per degree
 - C) 0.9 ft per second per degree
 - D) 0.8 ft per second per degree
8. The growth rate of the speed of sound in relation to the temperature in degrees Fahrenheit is a linear function. The speed of sound at 0 degrees Fahrenheit is 1052.3 feet per second. For every 1 degree Fahrenheit rise in temperature, the speed of sound increases by 1.1 feet per second. A 20 degree Fahrenheit rise in temperature would provide what increase in the speed of sound?
- A) 20 ft per second
 - B) 21 ft per second
 - C) 22 ft per second
 - D) 25 ft per second
9. On rural highways, the average speed S (in miles per hour) is related to the amount of curvature C (in degrees) of the road. Suppose that on a straight road ($C = 0$), the average speed is 47.5 miles per hour and that this decreases by 0.647 mph for each additional degree of curvature. Find the slope of the linear function expressing S in terms of C .
- A) 0.647 mph
 - B) - 0.647 mph
 - C) - 1.546 mph
 - D) 1.546 mph

10. On rural highways, the average speed S (in miles per hour) is related to the amount of curvature C (in degrees) of the road. Suppose that on a straight road ($C = 0$), the average speed is 47.5 miles per hour and that this decreases by 0.647 mph for each additional degree of curvature. What is the average speed if the curvature is 15 degrees?
- A) 42.3 mph
 B) 37.8 mph
 C) 57.2 mph
 D) 38.4 mph
11. The table below shows the total number of patients diagnosed with the flu in terms of days since an outbreak started:

Time in days	0	5	10	15	20	25
Number of flu patients	21	28	35	42	49	56

Find the formula for the linear function giving the number of diagnosed flu cases in terms of time if F is the number of flu patients diagnosed and d is time in days.

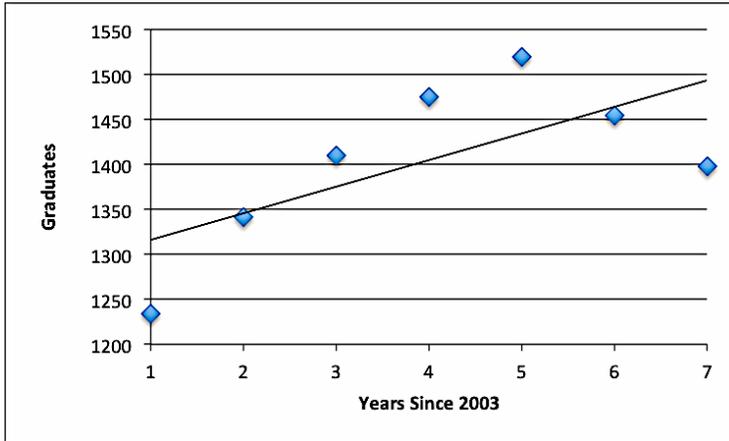
- A) $F = 21d + 0.7$
 B) $F = 0.7d + 21$
 C) $F = 1.4d + 21$
 D) $F = 2.1d + 0.7$
12. The following table shows the average life expectancy, in years, of a child born in the given year:

Year	2003	2004	2005	2006	2007
Life expectancy	77.1	77.5	77.4	77.7	77.9

If t denotes the time in years since 2003 and E is the life expectancy in years, then the trend line for this data is given by $E = 0.18t + 77.16$. If this trend line persisted through 2012, what would be the average life expectancy of a child born in 2012?

- A) 78.8 years
 B) 79.0 years
 C) 78.6 years
 D) 79.2 years

13. Below is a scatterplot and trend line showing the number of high school graduates at a local high school each year since 2003:



Does the trend line appear to offer an appropriate way to analyze the data? Explain your reasoning.