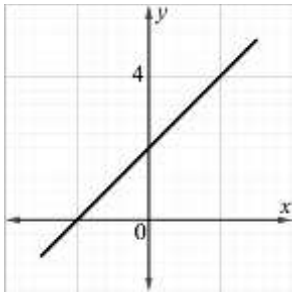
Date Completed: _____
Mentor Initials: _____

A mentor can change everything.

Linear Equations

No-Calculator: Multiple Choice



1. Which of the following is an equation of the line in the xy-plane above?
   A) $x = y$
   B) $x = -1 + y$
   C) $y = x + 2$
   D) $y = -x - 2$

2. Sherman purchases a coral reef tank for his bedroom. He puts 30 critters in the tank after setting it up and then begins to add critters at a rate of 2 per week. Which of the following represents the number of critters y in terms of x days?
   A) $y = 2x + 30$
   B) $y = 30x + 2$
   C) $y = \frac{2}{7}(x + 105)$
   D) $y = 30x - 2$

3. Jolene sells her hand-thrown ceramic plates at the farmer's market. There is a \$30 flat fee to rent a booth, and Jolene sells her pottery for \$9 per plate. If x represents the number of plates sold, which of the following represents Jolene's profits at the end of the day?
   A) $9x - 30$
   B) $30x - 9$
   C) $9x + 30$
   D) $-30x - 9$

4. While visiting New York City, you decide to take a cab. The cab fare is a flat fee of \$4.00 plus an additional fee of \$1.80 per mile. How much does it cost to ride for 7.2 miles in the cab?
   A) \$14.96
   B) \$16.40
   C) \$16.96
   D) \$19.96

5. Gemma opens a lemonade stand. She takes out a \$5.00 loan from her mom to pay for supplies and promises to pay her back at the end of the day. Gemma sells lemonade for \$0.50 per cup. If x represents the number of cups sold, which of the following equations represents Gemma's lemonade profit, after she pays her mom back?
   A) $5x + 0.5$
   B) $0.5x - 5$
   C) $0.5x + 5$
   D) $5x - 0.5$

6. In the xy-plane, the graph of which of the following equations is perpendicular to the graph of the equation $-3x + 4y = 12$?
   A) $4x + 3y = 24$
   B) $-4x + 3y = 12$
   C) $-3x - 4y = 24$
   D) $3x + 4y = 12$

7. In the xy-plane, the graph of the linear function f contains the points $(0, 3)$ and $(2, 7)$. Which of the following defines f?
   A) $f(x) = x + 3$
   B) $f(x) = x - 3$
   C) $f(x) = 2x + 3$
   D) $f(x) = 2x - 3$

8. Which linear equation has exactly one solution?
   A) $6x + 12 = 6x$
   B) $6x + 12 = 6x + 12$
   C) $6x + 12 = 3(2x + 4)$
   D) $6x + 12 = 3(3x + 5)$

No-Calculator: Grid In

9. Chiara rides a helicopter and is dropped off on a giant sand dune at 4,000 feet above sea level. Chiara begins trudging up the dune at 8:00 AM at a rate of 1,200 feet per hour. She stops from 12:00 PM to 12:30 PM to eat lunch and continues hiking. What altitude will Chiara reach at 1:00 PM?

10. Elijah is a seasoned scuba diver. On a dive in the Galapagos, Elijah spends some time filming hammerhead sharks and begins his ascent to the surface at 4:05 PM. Elijah knows that divers should ascend at a rate of no more than 30 feet per minute and paces himself at 26 feet per minute to be safe. Elijah safely surfaces and rests on the boat for exactly 2 minutes before checking the time. When he looks at his watch, the time is 4:11 PM. How many feet below the surface were the hammerheads swimming?

11. The function q is defined by $q(x) = \frac{3}{4}x + \frac{5}{4}$. Function p is parallel to function q and goes through the point $\left(0, \frac{7}{4}\right)$. What is the slope of the graph of $y = p(x)$ in the xy-plane?

Calculator: Multiple Choice

12. In the xy-plane, the point $(8, 4)$ lies on the graph of the line $y = kx + 2$, where k is a constant. What is the value of k?

A) $\frac{1}{4}$

B) $\frac{1}{8}$

C) 2

D) 4

13. In the xy-plane, the point $(x,\ 6)$ lies on the graph of the line $y - 12 = \frac{1}{2}(x - 10) + 2$. What is the value of x?

A) -8
B) -6
C) -4
D) 6

14. Hermione can brew potions at a rate of 8 potions every hour. She starts brewing potions at 4:00 AM and stops from 6:00 AM to 6:45 AM to sip coffee and read a book. After that, she brews potions again from 6:45 AM to 8:30 AM. By 8:30 AM, how many potions has Hermione brewed?

A) 22
B) 24
C) 26
D) 30

15. The Berkeley Community Supported Agriculture (CSA) would like to increase membership by a total number of n people per year. There were s people in the CSA at the beginning of this year. Which function best models the total number of people, y, the CSA plans to have as members x years from now?

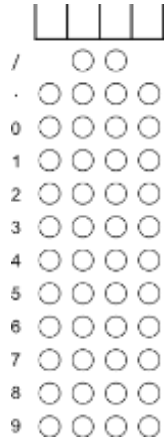
A) $y = nx - s$
B) $y = nx + s$
C) $y = s\ (n)^x$
D) $y = n(s)^x$

Calculator: Grid In

16. Maria draws the line $4y - 2x = 8$ and draws another line that is perpendicular to that line. She then draws a third line that is perpendicular to the second line. What is the slope of the third line that Maria draws?

17. $7x + 5 = bx + 3$

In the given equation, b is a positive integer constant less than 8. The equation has exactly one solution. What is the greatest possible value of b ?



18. $F(x) = \frac{9}{5}C + 32$

The function F gives the temerapture in degrees Fahrenheit that corresponds to a temperature of x degrees Celsius. If the temperature increases by 2.5 degrees Celsius, what is the corresponding temperature increase in degrees Fahrenheit?