MCTM

MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2015 MATH CONTEST
PROBLEM SOLVING TEST

DIRECTIONS: DO NOT WRITE ON THIS TEST. Place the best answer for each question on the separate answer sheet.
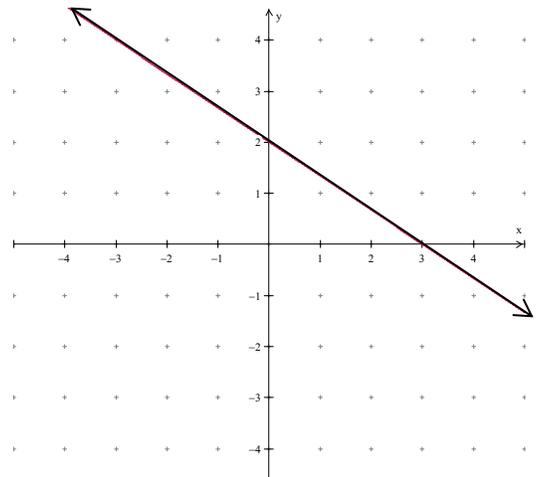**

1. Missoula's Aerial Fire Depot, the nation's largest training base for smokejumpers, is overtaken by zombies. As the newest smokejumper recruit reports for training, he quickly exits the visitor center and runs at a constant rate of 11.7 feet per second. After 30 seconds, a zombie starts pursuing the recruit at a constant rate of 9.48 miles per hour. How many seconds after the recruit leaves the visitor center does it take for the zombie to catch the recruit (round to the nearest second)?
   A) 128   **B)** 189   **C)** 159   **D)** never   **E)** None of these

2. If one zombie infects 3 Missoulians every 20 minutes, and each of the new zombies infect other Missoulians at the same rate, how many Missoulians will be zombies after one hour?
   A) 27   **B)** 36   **C)** 64   **D)** 40   **E)** None of these

3. The time it takes to drive to Lewistown is inversely proportional to the speed you drive. If it takes 4 hours to get to Lewistown driving 50 miles an hour, how fast do you need to drive to get there in 3 hours (to the nearest mph)?
   A) 49 mph   **B)** 100 mph   **C)** 67 mph   **D)** 38 mph   **E)** None of these

4. Tony's mom tells him, "If you clean your room, you can go to the movies." When Tony goes to the movies, he eats popcorn. Tony is eating popcorn. What can you conclude?
   A) Tony cleaned his room.   **B)** Tony did not clean his room.   **C)** Tony is at a movie.
                D) Tony is not at a movie.   **E)** None of these

5. Your test scores so far this semester are 73, 82, 91, 64, and 85. What score do you need on your next test to get a test average of 80?
   A) 80   **B)** 81   **C)** 84   **D)** 85   **E)** None of these

6. What is the next term in the following sequence? 0, 1, 1, 2, 3, 5, 8, …
   A) 13   **B)** 11   **C)** 12   **D)** 10   **E)** None of these

7. Select the point-slope equation that best represents the line shown in the graph.
   A) $y = -\frac{2}{3}x + 2$ **B)** $y - 4 = -\frac{2}{3}(x + 3)$
   C) $4x + 6y = 12$ **D)** $3x + 2y = 6$
   E) None of these

8. Select the standard form equation that best represents the line shown in the graph.
   A) $y = -\frac{2}{3}x + 2$ **B)** $y - 4 = -\frac{2}{3}(x + 3)$
   C) $4x + 6y = 12$ **D)** $3x + 2y = 6$
   E) None of these

9. Each time she watches The Big Bang Theory, Ann records the number of times she hears the word "Bazinga". The first 8 episodes yielded this data: 2, 7, 4, 1, 3, 0, 4, 4. If the next episode contains 5 bazingas, which of the following is true?
   A) only the mean changes   B) only the median changes   C) the mean & the median both change
            D) neither the mean nor the median changes   E) None of these

10. The gross pay of an employee varies directly as the number of hours worked. If Jesse earns $177 working 12 hours, how much will he make in 14 hours?
    A) $14.75   B) $206.50   C) $179.00   D) $151.71   E) None of these

11. A particular model of a 2015 Dodge Ram truck costs $45,700. The annual depreciation rate for this truck is 12%. Assuming quality driving and maintenance, what will this truck be valued at 5 years after purchase (to the nearest cent)?
    A) $1.14   B) $40,216.01   C) $20,108.47   D) $24,117.35   E) None of these
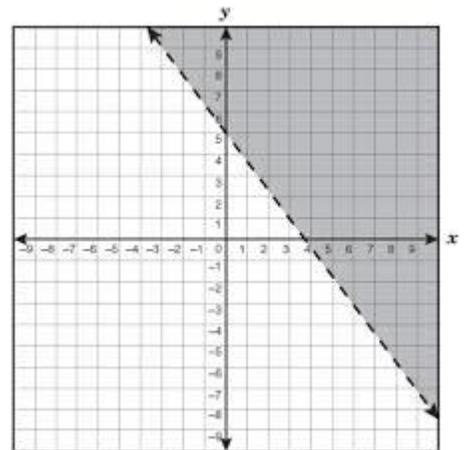
12. Dr. House is seeing a patient. He runs two tests with the results in the table. If Test A results are less than 12 mcg, the patient has either Lupus or Crohn's Disease. If Test B results are between 0 and 4 mL, the patient does not have Lupus. What can Dr. House conclude?

Test	Result
A	15 mcg
B	2.7 mL

    A) the patient has Crohn's   B) the patient has lupus   C) the patient does not have Crohn's
            D) the patient does not have lupus   E) None of these

13. Which of the following is equivalent to $4(c - d) + 4cd + (-4c)$?
    A) $8c - 4d + 4cd$ B) $4d + 4cd$ C) $-4c$ D) $4cd$ E) None of these

14. During a 12 game football season, the Rocky Ford Meloneers scored the following:
$$14, 21, 24, 21, 0, 3, 38, 41, 14, 21, 6, 18$$
    Find the interquartile range of their scores.
    A) 12.5   B) 7   C) 41   D) 18   E) None of these

15. In the equation $y = 3x + 7$, y is measured in miles and x is measured in hours. What is the correct unit of measure for the 3 in the equation?
    A) miles   B) hours   C) miles per hour   D) hours per mile   E) slope

16. Which of the following inequalities best represents the graph at the right?
    A) $y \geq -\frac{4}{3}x + 5$ B) $y > -\frac{4}{3}x + 5$ C) $y \leq -\frac{4}{3}x + 5$
          D) $y < -\frac{4}{3}x + 5$ E) $y = -\frac{4}{3}x + 5$

17. Which of the following is not a solution to the inequality shown in the graph at the right?
                I. (4,2)   II. (3,-1)   III. (6,-3)
    A) I only   B) II only   C) III only   D) I & II   E) II & III

18. Which of the following are synonymous with "domain value"?
    A) independent variable   B) x-value   C) input   D) All of these   E) None of these

PROBLEM SOLVING 2015 Answer Key

1.)   B
2.)   C
3.)   C
4.)   E
5.)   D
6.)   A
7.)   B
8.)   C
9.)   C
10.)   B
11.)   D
12.)   D
13.)   E
14.)   A
15.)   C
16.)   B
17.)   E
18.)   D