

MONTANA COUNCIL OF TEACHERS OF MATHEMATICS  
2017 MATH CONTEST  
TEAM 7 - 8

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

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1. Evaluate  $rs - st$  when  $r = -4$ ,  $s = -1$ , and  $t = 2$ .

- A) -8                      B) -3                      C) 2                      D) 6                      E) none of these

2. The surface area of a regular square pyramid is  $S = B + \frac{1}{2}ph$  where  $B$  is the area of the base,  $p$  is the perimeter of the base, and  $h$  is the height. Solve for  $p$ .

- A)  $p = \frac{2S-B}{h}$                       B)  $p = \frac{2S}{h} - B$                       C)  $p = \frac{2S-2B}{h}$                       D)  $p = 2 - \frac{B}{h}$                       E) none of these

3. Find an equation of the line with a slope of  $\frac{-3}{2}$  and containing the point  $(-4, 1)$ .

- A)  $3x + 2y = -14$                       B)  $3x - 2y = 10$                       C)  $3x + 2y = -10$                       D)  $3x - 2y = 14$                       E) none of these

4. What is the formal definition of pi?

- A) the surface area of a sphere of diameter  $\frac{22}{7}$                       B) 3.1415926                      C) the radius of a circle  
D) the ratio of a circle's circumference to its diameter                      E) none of these

5. Imagine you wrapped a rope tightly around Earth at the equator. How much **longer** would you have to make the rope if you wanted it to be exactly one foot above the surface all the way around? Ignore mountain ranges. Let  $r$  represent Earth's radius.

- A)  $2\pi$  feet                      B)  $2\pi r$  feet                      C)  $\pi r^2$  feet                      D) 1 foot                      E) none of these

6. Pi is an irrational number. What does this really mean?

- A) Its digits cannot be rationed out evenly                      B) Nobody with sound judgement has anything to do with it  
C) It cannot be expressed as a ratio of two integers                      D) 3.1415926                      E) none of these

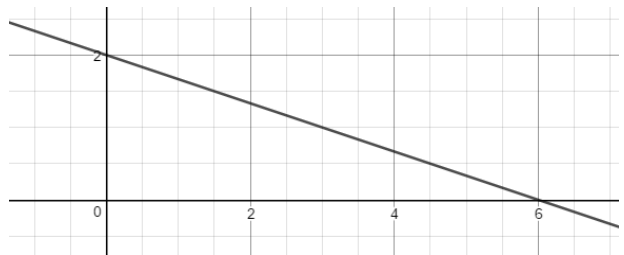
For questions 7 – 8, use the graph at right.

7. Which of the following equations best represents this graph?

- A)  $x + 3y = 6$                       B)  $2x + 6y = 1$                       C)  $3x + y = 2$   
D)  $6x + 2y = 1$                       E) none of these

8. Find the area of the triangle enclosed by the line, the  $x$ -axis, and the  $y$ -axis.

- A) 3                      B) 6                      C) 12                      D) 24                      E) none of these



9. The smallest composite number is:

- A) 2                      B) 11                      C) 16                      D) 27                      E) none of these

10. What is the probability of rolling a sum of 6 when you roll a pair of standard dice?

- A)  $\frac{1}{12}$                       B)  $\frac{5}{36}$                       C)  $\frac{1}{6}$                       D)  $\frac{1}{2}$                       E) none of these

11. Fahrenheit temperatures during a typical Montana winter are best represented by which group of numbers?

- A) naturals                      B) wholes                      C) integers                      D) irrationals                      E) none of these

12. Represent  $0.41\bar{6}$  as a fraction.

- A)  $\frac{416}{1000}$                       B)  $\frac{416}{100}$                       C)  $\frac{5}{12}$                       D)  $41\frac{2}{3}$                       E) none of these

For questions 13 – 17, use the diagram at right.

13. Find the perimeter of the house, including porches.

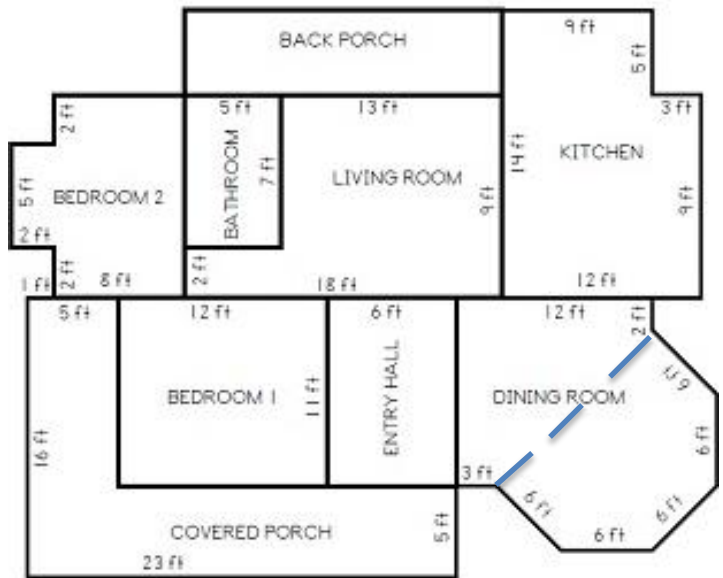
- A) 117 ft                      B) 142 ft                      C) 145 ft  
D) 153 ft                      E) none of these

14. Find the combined area of the bedrooms

- A) 204 sq ft                      B) 214 sq ft                      C) 222 sq ft  
D) 249 sq ft                      E) none of these

15. If we were to eliminate the octagonal portion of the dining room from our house design (see dashed line segments in the diagram), what is the area of the smaller, pentagonal dining room?

- A) 66.5 sq ft                      B) 85.5 sq ft                      C) 91.5 sq ft  
D) 97.5 sq ft                      E) none of these



16. Which of the following are Pythagorean triples?

- A) 6, 8, 10                      B) 8, 15, 17                      C) 12, 35, 37                      D) all of these                      E) none of these

17. What is the smallest 2-digit number such that the sum of the digits equals the product of the digits?

- A) 11                      B) 22                      C) 33                      D) 44                      E) none of these

18. The admission fee for preliminary rounds of the state basketball tournament is \$1.50 for students (S) and \$4.00 for adults (A). For one particular game, 2200 people enter the arena and \$5050 is collected. How many students and how many adults attended that game?

- A) S = 700, A = 1500    B) S = 2900, A = 700    C) S = 682, A = 1518    D) S = 1650, A = 550    E) none of these

**2017 TEAM 7 - 8 Answer Key**

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