

MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2013 MATH CONTEST
TEAM 9-10

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

1. Solve the matrix equation for r and s :

$$\begin{bmatrix} 2 & -5 & 1 \\ 6 & r & -3 \end{bmatrix} - 3 \begin{bmatrix} s & \frac{1}{3} & -2 \\ 5 & 4 & -1 \end{bmatrix} = \begin{bmatrix} 11 & -6 & 7 \\ -9 & 15 & 0 \end{bmatrix}$$

- A) $r = 3, s = 3$ B) $r = 27, s = -3$ C) $r = 11, s = 9$ D) $r = 19, s = -9$

2. Your school cafeteria is selling meatloaf and peas for lunch. If the probability of having meatloaf on Friday is 0.6, and the probability of serving peas given meatloaf is 0.3, what is the probability that you will not be served peas next Friday?

- A) 0.54 B) 0.46 C) 0.7 D) 0.82

3. Ruth's personal Ferris Wheel has a diameter of 200 feet, and makes one rotation every 4 minutes. What is the speed of a car on the circumference when the wheel is in operation?

- A) 50 ft/min B) 157 ft/min C) 3.14 ft/sec D) 15.7 ft/sec

4. What is the volume of concrete in a driveway that is 30 feet long, 12 feet wide and 4 inches thick?

- A) 1440 ft³ B) 550 ft³ C) 17,280 ft³ D) 120 ft³

5. Chris is painting a room in his house that is 50 feet by 35 feet by 12 feet. Each gallon of paint covers 350 square feet, and the store sells paint in 5-gallon containers. How many 5-gallon containers will he need to buy to paint the entire surface area of the room?

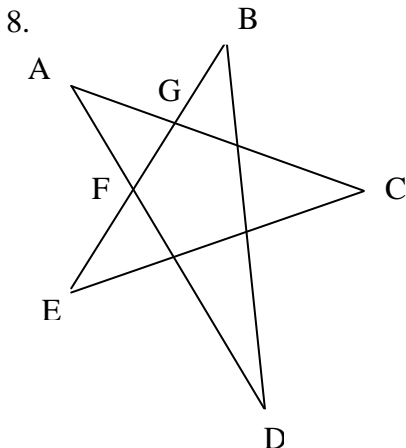
- A) 10 containers B) 3 containers C) 2 containers D) 1 container

6. Linda buys a pickup for \$14,000. Its value decreases at 12% per year. Approximately how much was the pickup worth 4 years before Linda bought it?

- A) \$20,736 B) \$8,396 C) \$22,029 D) \$25,999

7. You invest \$5,000 into a Certificate of Deposit that advertises a 3.25% annual interest rate. If the interest is compounded monthly, how much money will you have in 50 years?

- A) \$25,336.38 B) \$5724.02 C) \$24,744.18 D) 1.96×10^{29}



If $m\angle A = 20^\circ$ and $m\angle AFG = m\angle AGF$, then $m\angle B + m\angle D = ?$

- A) 48°
 B) 60°
 C) 72°
 D) 80°

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9. The fifth term of an arithmetic sequence is 31. The eighth term of this arithmetic sequence is 52. What is the 100th term in this sequence?
 A) 693 B) 696 C) 706 D) 703

10. Solve this system of equations:

$$\begin{aligned} x + 3y &= -9 \\ y - 1 &= \frac{5}{2}(x - 5) \end{aligned}$$

- A) (3, -4) B) (5, 1) C) (0, -3) D) (-5, -1)

11. You and your friends are disc golfing in Billings. The first tee box is on top of the Rims, which is 300 feet above the ordinary. The basket is 150 feet away from the base of the rims. At what angle of depression, do you need to throw the disk (assuming you throw in a straight line) to get a hole in one, to the nearest degree?

- A) 63° B) 27° C) 30° D) 60°

12. The following polynomial represents the area of a square. What is the length of a side?

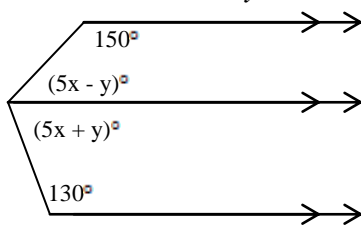
$$49x^2 - 182x + 169$$

- A) $13x + 7$ B) $13x - 7$ C) $7x - 13$ D) $7x + 13$

13. The length of one side of an ice cube can be represented by the polynomial, $4x-3$. What is the volume of the ice cube?

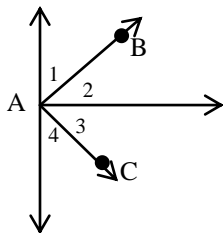
- A) $64x^3 - 27$ B) $16x^2 - 24x + 9$ C) $64x^3 - 144x^2 + 108x - 27$ D) $64x^3 - 48x^2 + 12x - 27$

- 14) Find the values of x and y .



- A) (110, 10)
 B) (10, 8)
 C) (10, 110)
 D) (8, 10)

- 15) If $\angle 3$ and $\angle 4$ are complementary, determine whether $\overrightarrow{AB} \perp \overrightarrow{AC}$.



- A) Sometimes true
 B) Always true
 C) Never true
 D) Cannot be determined

16. The midpoint of a line segment is $\left(\frac{1}{3}, 6\right)$ and the endpoint is $\left(-4\frac{5}{6}, 10\right)$. What is the other endpoint?

- A) $\left(-\frac{9}{4}, 8\right)$ B) $\left(5\frac{1}{2}, 2\right)$ C) $\left(-\frac{31}{6}, 4\right)$ D) $\left(\frac{1}{3}, 8\right)$

TEAM 9-10 2009 Answer Key

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