



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2015 MATH CONTEST
APPLIED

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

- Sue and Dan walked into Cabela's just in time for their annual sale on hiking boots. They each found a pair that they liked. Dan's boots were originally priced at \$129.95, and were on sale for 15% off. Sue's pair were priced at \$165.99 and were discounted 25%. Together, how much did they save by buying their boots on sale?
A) \$234.95 B) \$19.49 C) \$60.99 D) \$124.49 E) none of these
- Carlos is paid a salary of \$1300 a month plus a 7% commission on his sales over \$4500. Last month, Carlos sold \$6800 worth of merchandise. What were his gross earnings for the month?
A) \$161 B) \$1776 C) \$476 D) \$1461 E) none of these
- If the price of a T-shirt increases from \$12.00 to \$16.00, and then decreases from \$16.00 to \$12.00, what is the difference between the percent increase and the percent decrease, to the nearest hundredth?
A) 0% B) 8.33% C) 10% D) 5% E) none of these
- For which function is the domain all real numbers except 0 and the range all real numbers except 8?
A) $y = \frac{1}{x} + 8$ B) $y = \frac{8}{x}$ C) $y = \frac{1}{x-8}$ D) $y = \frac{1}{x} - 8$ E) $y = \frac{1}{x+8}$
- Kara spends \$16.00 on coffee and cookies for friends. Each cup of coffee costs \$3.00 and each cookie costs \$0.50. Kara purchases twice as many cookies as cups of coffee. How many cookies did she buy?
A) 4 cookies B) 8 cookies C) 12 cookies D) 16 cookies E) none of these
- The endpoints of a line segment are (x, y) and $(2x - 1, y + 4)$. If the midpoint of the segment is $(7, -10)$, find the distance between the endpoints of the segment.
A) 32 B) 4 C) $2\sqrt{2}$ D) $4\sqrt{2}$ E) none of these
- Mr. White wants to mail a rainstick to a math teacher in Wolf Point. If the box he has measures 15 inches by 10 inches by 7 inches what is the maximum length of the rainstick to the nearest inch?
A) 25 inches B) 19 inches C) 18 inches D) 16 inches E) 12 inches
- An oil well in the Bakken field pumps its oil into a tank 30 feet in diameter and 18 feet high. How many cubic feet of oil will it take to fill the tank? Round answers to the nearest 10 cubic feet.
A) 3110 cu ft B) 12,720 cu ft C) 50,870 cu ft D) 850 cu ft E) none of these
- For the oil tank above, what is the surface area of the tank? Remember to include the bottom! Round your solution to the nearest 10 square feet.
A) 3110 sq ft B) 12,720 sq ft C) 50,870 sq ft D) 850 sq ft E) none of these
- The scale on the blueprint for a house is 1 inch to 3 feet. If the living room on the blueprint is 5.5 inches by 7 inches, what is the floor area of the living room?
A) 38.5 sq ft B) 115.5 sq ft C) 75 sq ft D) 346.5 sq ft E) none of these
- On a bright and sunny day, Sam was standing outside and found his shadow to be 2 feet long. Since Sam is 5 feet 8 inches tall, he figured he would calculate the height of the tree outside his house. He measured the tree's shadow to be 10.3 feet long. How tall is the tree, to the nearest tenth of a foot?
A) 29.9 feet B) 3.6 feet C) 29.2 feet D) 20.6 feet E) none of these

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12. A quadrilateral has angles measuring x , $2x+2$, $4x-1$, and $3x+9$. Find the measure of the largest angle.
 A) 35 degrees B) 147 degrees C) 139 degrees D) 120 degrees E) none of these
13. Write an equation of the line that passes through the point $(-3, 5)$ and is perpendicular to the line $3x+2y=7$.
 A) $y = \frac{2}{3}x + 7$ B) $y = -\frac{3}{2}x + \frac{1}{2}$ C) $y = \frac{-3}{2}x + 7$ D) $y = \frac{2}{3}x + 5$ E) none of these
14. Liam needs to find the height of a statue at City Hall. He paces out 20 feet from the base and uses a clinometer to measure the angle from where he is standing to the top of the statue. The angle formed from the ground to the top is 54 degrees. Calculate the height of the statue.
 A) 14.5 feet B) 27.5 feet C) 11.8 feet D) 16.1 feet E) 24.7 feet
15. Granite Peak is the highest point in Montana at 12,808 feet. If Sarah is standing in Livingston, MT (elevation 5043 feet) and looking at Granite Peak 47 miles away, what is the angle of elevation from Livingston to Granite Peak?
 A) 89.7 degrees B) 3 degrees C) 0.35 degrees D) 12 degrees E) none of these
16. An octahedral die (numbered 1 through 8) is rolled 200 times. About how many times should it land on a composite number?
 A) 100 times B) 75 times C) 50 times D) 133 times E) 150 times
17. Seven runners are in the first heat of the 100 meter dash. In how many different ways can the first, second, and third places be awarded?
 A) 5040 ways B) 343 ways C) 3 ways D) 210 ways E) none of these
18. The FFA club is sponsoring a "Cow Pie Bingo". Given an 18 ft X 18 ft enclosure, what is the probability that the cow pie will land in a specific 2 ft X 2 ft square?
 A) $\frac{1}{9}$ B) $\frac{1}{36}$ C) $\frac{1}{18}$ D) $\frac{5}{18}$ E) $\frac{1}{81}$
19. Given that y varies inversely with x , if $x = \frac{1}{2}$ when $y = 14$, find the value of y when $x = 4$.
 A) 1.75 B) 7 C) 28 D) 3.5 E) none of these
20. Jordan rolled a single die 30 times. His results are as follows: 4 ones, 8 twos, 4 threes, 7 fours, 5 fives, and 2 sixes. If he rolls the die another time, what is the probability that he will roll a six?
 A) $\frac{1}{15}$ B) $\frac{1}{30}$ C) $\frac{1}{6}$ D) $\frac{6}{31}$ E) $\frac{3}{31}$
21. How would the graph of the function $f(x) = x^2 - 8$ be affected if the function were changed to $f(x) = x^2 - 3$?
 A) the graph would translate 5 units left B) the graph would translate 5 units down
 C) the graph would translate 5 units up D) the graph would translate 3 units down
 E) the graph would translate 3 units up

22. Which function represents the data shown in the table below?

x	-2	-1	0	1	2
y	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9

- A) $y = 2 \cdot 3^x$ B) $y = -3^x$ C) $y = \left(\frac{1}{3}\right)^x$ D) $y = 3x$ E) $y = 3^x$

APPLIED 2015 ANSWER KEY

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