



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2019 MATH CONTEST
Number Concepts

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

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- Ten MCTM math test writers are having dinner and each person will eat 3 cookies. The cookie recipe makes 12 cookies in a batch and calls for $2\frac{1}{3}$ cups of sugar. How much sugar is needed to bake the exact number of cookies needed to feed the test writers?
A) $5\frac{5}{6}$ B) $5\frac{1}{2}$ C) $23\frac{1}{3}$ D) 5.75 E) none of these
- The sum of the squares of two consecutive positive integers is 145. What is the sum of the two integers?
A) 14 B) 15 C) 16 D) 17 E) none of these
- I am a whole number. If you multiply me by 4, then subtract 5, I am the 9th prime number. What number am I?
A) 7 B) 20 C) 38 D) 72 E) none of these
- You need a new pair of shoes and found a great sale on Nikes. They were originally \$120 and are now 42% off. How much money do you save with the discount?
A) \$50.40 B) \$62.80 C) \$69.60 D) \$78.00 E) none of these

Use the following information for questions 5-7. Mason must choose between two cell phone plans. Verizon's plan is \$40 plus \$6 per GB of data that you use. Straight Talk is \$45 plus \$4 per GB of data that you use.

- For how many GB will the two plans cost the same amount?
A) 1 GB B) 1.5 GB C) 2 GB D) 2.5 GB E) none of these
- If the bill for April using Straight Talk is \$77, how much data did Mason use?
A) 8 GB B) 156 GB C) 275 GB D) 353 GB E) none of these
- Using the Verizon plan, predict how much Mason's bill will be after he uses 12 GB of data in one month.
A) \$2.75 B) \$4.67 C) \$93 D) \$112 E) none of these
- Find the 18th term of the arithmetic sequence: -3, 1, 5, 9, 13...
A) 63 B) 65 C) 69 D) 71 E) none of these
- Buffy the bison can run at 35 miles per hour. If she charges you because you got too close to her baby calf, how many feet per second can she run? Round your answer to the nearest tenth.
A) 42.5 ft/sec B) 51.3 ft/sec C) 56.6 ft/sec D) 216.5 ft/sec E) none of these
- In the proportion $\frac{x}{15} = \frac{3}{y}$, how does the value of x change as y gets smaller?
A) decreases then increases B) decreases C) increases D) stays the same E) none of these
- Julie receives 30 snap chats a day and 6 texts. Bob receives 33 snap chats a day and 9 texts. What is Bob's ratio of snaps to texts?
A) $\frac{1}{5}$ B) $\frac{3}{11}$ C) $\frac{11}{3}$ D) $\frac{5}{1}$ E) none of these

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12. Find the prime factorization of 588.

- A) $2^2 \cdot 3 \cdot 7^2$ B) $2 \cdot 3 \cdot 7^2$ C) $2^2 \cdot 3 \cdot 147$ D) $2 \cdot 3 \cdot 147$ E) none of these

13. A total of 9 students received A's on their last Science Test. This represents 30% of their class. How many students received a B or less?

- A) 3 B) 9 C) 23 D) 30 E) none of these

Use the following information for questions 14-16: Students scored the following percentages on their Math Final: 64, 70, 72, 72, 80, 84, 87, 92, 99, 100

14. What is the mean?

- A) 20 B) 36 C) 72 D) 82 E) none of these

15. What is the median?

- A) 20 B) 36 C) 72 D) 82 E) none of these

16. What is the Interquartile Range?

- A) 20 B) 36 C) 72 D) 82 E) none of these

17. What is the area of a rectangle if the width is $2x-3$ and the length is $3x+5$, when x is 2?

- A) 6 square units B) 11 square units C) 12 square units D) 47 square units E) none of these

18. Simplify the following expression: $(6x-9y+4z) - (3x-z+3y)$

- A) $9x + 10y + 7z$ B) $3x - 12y + 5z$ C) $3x - 8z + y$ D) $3x - 12y - 10z$ E) none of these

19. What is the next number in the following sequence: $-72, 24, -8, \frac{8}{3}, \dots$

- A) $-\frac{8}{9}$ B) $-\frac{4}{3}$ C) $\frac{4}{3}$ D) $\frac{8}{9}$ E) none of these

20. What two positive integers is the square root of 213 between?

- A) 14, 15 B) 106, 107 C) 212, 213 D) 213, 214 E) none of these

21. What is the value of n if $\frac{1}{4} = \frac{1}{6} + \frac{1}{n}$?

- A) 2 B) 10 C) 12 D) 24 E) none of these

22. What is the sum of all of the distinct, positive prime factors of 126?

- A) 2 B) 6 C) 9 D) 12 E) none of these

23. Evaluate the following expression: $7! - 5! + 6$

- A) 8 B) 19 C) 3,926 D) 4,926 E) none of these

Number Concepts 2019 Answer Key

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