



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS  
2015 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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Use the following information for questions 1 and 2: The wheels on Jennifer's bike are 27 inches in diameter. The wheels on Nicole's bike are 20 inches in diameter. Use 3.14 for your calculations.

- How far does Nicole travel in 5 revolutions of her tires?  
A) 20      B) 80      C) 200      D) 314      E) None of these
- Approximately how much further does Jennifer travel in 5 revolutions than Nicole?  
A) 100      B) 110      C) 120      D) 130      E) None of these

For questions 3 and 4: Suppose you have a bag containing five blocks. One of the blocks is labeled as winner.

- What is the probability of drawing the winning block?  
A)  $\frac{1}{5}$       B)  $\frac{1}{4}$       C)  $\frac{1}{3}$       D)  $\frac{1}{2}$       E) None of these
- How many additional "winning blocks" would you need to add to make the probability of drawing the winning block greater than 60%?  
A) 2      B) 4      C) 5      D) 6      E) None of these
- What is a 15% tip on a \$36.20 bill?  
A) \$3.62      B) \$5.43      C) \$7.24      D) \$9.22      E) None of these
- What is the next number in this sequence? 1, 3, 6, 10, ...  
A) 12      B) 13      C) 14      D) 15      E) None of these

For questions 7 and 8, use the following information. A survey of students at your middle school found that 22 out of the 30 students would like to buy a school t-shirt to show their school pride. T-Shirts cost \$8 to make.

- If there are 210 students who attend your school, how many students do you predict will want to buy a t-shirt?  
A) 56      B) 100      C) 154      D) 188      E) None of these
- If you choose to sell the t-shirts for \$11 instead of \$8, approximately what percent increase will your profit gain?  
A) 27%      B) 37.5%      C) 127%      D) 137.5%      E) None of these

Use the following information for questions 9-10. In Tony's math class, his grade is based solely on his quiz scores. Each quiz is worth 10 points. He has taken six-10 point math quizzes this semester, scoring 5, 9, 8, 10, 8 and 10.

- Rounded to the nearest whole percentage, what is his current quiz average for this semester?  
A) 80%      B) 83%      C) 90%      D) 95%      E) None of these
- If he doesn't take the next quiz and receives a zero, by how many whole percentage points will his average change?  
A) 10%      B) 11%      C) 12%      D) 13%      E) None of these

NUMBER CONCEPTS 2015 page 2

11. What two whole number positive integers is  $\sqrt{113}$  between?  
A) 10, 11    B) 11, 12    C) 112, 113    D) 113, 114    E) None of these
12. The standard form of  $6^{15}$  is 470,184,984,576. What is the product of the last two digits of the standard form of  $6^{16}$ ?  
A) 12    B) 18    C) 25    D) 30    E) None of these
13. Simplify the following expression:  $(950 + 4t + 17a) - (300 + 5t + 8a - 9)$   
A)  $650 - t - 9a + 9$     B)  $650 + 9t + 25a - 9$     C)  $1250 + 9t + 25a - 9$   
D)  $650 - t - 9a - 9$     E) None of these

Use the following information for questions 14 – 16. Wendy must choose between two babysitters, Linda or Sheri. Linda babysits for \$6.50 an hour and Sheri babysits for a base rate of \$24 plus \$0.50 an hour.

14. If Wendy will be gone for 3 hours, how much will it cost for her to have Sheri babysit?  
A) \$25.50    B) \$26    C) \$27    D) \$27.50    E) None of these
15. How long will Wendy have to be gone for the price of both babysitter be the same?  
A) 3    B) 4    C) 5    D) 6    E) None of these
16. Which value is not needed to create a box plot?  
A) upper quartile    B) minimum value    C) median  
D) mean    E) None of these
17. The sum of 5 consecutive integers is 110. What is the sum of the largest and smallest terms.  
A) 20    B) 22    C) 24    D) 44    E) None of these
18. John has an ants and spider collection. In his terrarium, there are 32 creepy crawlers. Those 32 creepy crawlers have 226 legs all together. How many spiders are in there? (Hint: Ants have 6 legs and spiders have 8)  
A) 15    B) 17    C) 90    D) 136    E) None of these
19. Hermione is making a love potion in her potions class at Hogwarts. She needs 8 cups of rose thorns and 3 cups of powdered moonstone. If she only has 5 cups of rose thorns, how many cups of powdered moonstone will she need?  
A)  $1\frac{7}{8}$     B) 2    C)  $8\frac{3}{5}$     D)  $11\frac{2}{3}$     E) None of these
20. The 6 interior angles of a hexagon are in the ratio of 2:3:4:5:6:7. What would the median angle measure be?  
A)  $106\frac{2}{3}$     B) 120    C)  $133\frac{1}{3}$     D) 150    E) None of these
21. What is the sum in base four of the following:  $333_4 + 333_4$   
A)  $1332_4$     B)  $1333_4$     C)  $1334_4$     D)  $1335_4$     E) None of these
22. Bobbie is making a ruler in woodshop. He places a long mark at every whole number, a medium mark at every half inch, and a tiny mark at every quarter inch. How many marks will he need to make a standard 1 foot ruler?  
A) 23    B) 45    C) 47    D) 48    E) None of these
23. Jess spent \$49 for shoes. This was \$15 more than twice what she spent for a t-shirt. How much was the t-shirt?  
A) \$15    B) \$16    C) \$17    D) \$18    E) None of these

## Number Concepts 2015 Answer Key

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