



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS  
2012 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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- Serena was paid \$8 an hour during her first year at work and \$8.60 an hour the second year. What was her percent raise?  
A) 60%                      B) 7.5%                      C) 9.3%                      D) 10%
- Kerry and Tyler earned yearly salaries of \$32,000 and \$28,000, respectively. They were given proportional raises and Tyler now earns \$29,540. What is Kerry's new salary?  
A) \$33,760                      B) \$33,500                      C) \$35,000                      D) \$28,000
- Find the next term in the sequence 1, 9, 25, 49, ...  
A) 71                      B) 81                      C) 85                      D) 93
- $\square ABC$  is similar to  $\square XYZ$ .  $m\overline{AB} = 4\text{in}$ ,  $m\overline{BC} = 5\text{in}$ ,  $m\overline{AC} = 6\text{in}$ ,  $m\overline{XY} = 12\text{in}$ . What is the perimeter of  $\square XYZ$ ?  
A) 15in                      B) 30in                      C) 45in                      D) 90in
- Felix Hernandez's fastball has been timed at 95 mph. The pitching rubber is 60ft, 6in from home plate. About how long does it take Felix's fastball to reach home plate?  
A) 2.3 sec                      B) 0.43 sec                      C) 0.95 sec                      D) 0.23 sec
- Jason's salary went from \$16,000 to \$24,000 over a four year time period. What was his percent raise over those four years?  
A) 66%                      B) 50%                      C) 30%                      D) 25%
- What number is not a factor of 144?  
A) 12                      B) 36                      C) 48                      D) 32
- A sandwich shop can make sandwiches with four different types of bread, four different types of meat, and three different types of cheese. How many different sandwiches can they make with one type of bread, one type of meat and one type of cheese?  
A) 36                      B) 12                      C) 24                      D) 48
- Andrew is buying new shoes. The cost of the shoes he wants is \$120. The sales tax is 7.5%, and he has a 20% off savings card. The shoe company is offering a \$15 mail-in rebate. What will Andrew's final price be for the shoes after he receives the rebate in the mail?  
A) \$139.80                      B) \$118.20                      C) \$88.20                      D) \$96.30
- Suppose you pick a red M&M from a bag of different-colored M&Ms 6 out of every 10 times. What is the probability that you will not choose a red M&M?  
A) 60%                      B) 6%                      C) 40%                      D) 94%

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11. In the proportion  $\frac{20}{x} = \frac{y}{5}$ , how does the value of  $y$  change as the value of  $x$  gets larger?  
A) Increases      B) Decreases      C) Stays the same      D) Decreases, then increases
12. Fill in the blank:      2% of 98 \_\_\_\_ 98% of 2  
A) >      B) <      C) =      D) Cannot be determined
13. On a map of Montana, the scale reads 1 inch = 50 miles. If you measure a distance on the map as  $2\frac{3}{5}$  inches, how far is the actual distance in miles?  
A) 19.2 miles      B) 100 miles      C) 115 miles      D) 130 miles
14. Geothermal energy is heat from inside Earth. Underground temperatures generally increase  $12^{\circ}\text{C}$  for every 400 feet of depth. How deep would you have to dig so that the underground temperature is  $90^{\circ}\text{C}$  greater than the ground temperature?  
A) 3000 feet      B) 36000 feet      C) 7.5 feet      D) 3200 feet
15. Which of these is not equivalent to 130%?  
A)  $\frac{13}{10}$       B) 1.3      C)  $\frac{130}{100}$       D)  $1\frac{3}{100}$
16. Express \$4.75 for 5 minutes as a unit rate.  
A) \$4.71/min      B) \$0.95/min      C) \$95/min      D) \$23.75/min

Use the following data for problems 17-19.

The list shows the suggested retail prices of several different handheld music devices.

\$35    \$50    \$100    \$110    \$50    \$300    \$75    \$85    \$50

17. Find the mean, median and mode.  
A) Mean: 95; Median: 75; Mode: 50  
B) Mean: 75; Median: 95; Mode: 50  
C) Mean: 50; Median: 75; Mode: 50  
D) Mean: 75; Median: 50; Mode: 95
18. Find the range of the data  
A) \$15      B) \$250      C) \$75      D) \$265
19. If a price of \$250 is added to the list, which measure is affected most?  
A) Mean      B) Median      C) Mode      D) Range
20. If 16 students can fit at a lunch table, what is the minimum number of tables needed to seat 130 students?  
A) 8 tables      B) 8.125 tables      C) 9 tables      D) 2080 tables
21. If  $a$  and  $b$  are non-zero integers, the product  $ab$  is \_\_\_\_\_.  
A) always positive  
B) sometimes positive  
C) never positive  
D) always negative
22. Which set of numbers is relatively prime?  
A) 10 and 15      B) 15 and 22      C) 22 and 30      D) 30 and 39

## Number Concepts Math 2012 Answer Key

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