



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2011 MATH CONTEST
TEAM 9-10

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

- Mr. Smith is a teacher whose salary is \$22570 for this school year, which has 185 days. In Mr. Smith's school district, substitute teachers are paid \$80 per day. If Mr. Smith takes a day off without pay and a substitute teacher is paid to teach Mr. Smith's classes, how much less does the school district pay in salary by paying a substitute teacher instead of paying Mr. Smith for that day?
a.) \$42 b.) \$80 c.) \$97 d.) \$105
- If the measures of the angles of a triangle are in the ration 3:3:4, what is the measure of the largest angle of the triangle?
a.) 40° b.) 54° c.) 72° d.) 90°
- A 25 foot ladder is placed against a vertical wall of a building. The foot of the ladder is 7 feet from the base of the building. If the top of the ladder slips 4 feet, how many feet will the bottom of the ladder slide?
a.) 9 feet b.) 15 feet c.) 5 feet d.) 8 feet
- If the coordinates of a rectangle are (2,7), (2, 4), (4, 4), and (4,7), what is the length of a diagonal of the rectangle?
a.) 8 b.) 3 c.) $\sqrt{13}$ d.) $3\sqrt{2}$
- If a marble is randomly chosen from a bag that contains exactly 8 red marbles, 6 blue marbles, and 6 white marbles, what is the probability that the marble will NOT be white?
a.) $\frac{3}{4}$ b.) $\frac{3}{5}$ c.) $\frac{4}{5}$ d.) $\frac{7}{10}$
- If $a = b + 2$, then $(b - a)^4 =$
a.) -16 b.) -8 c.) 8 d.) 16
- An open box is to be manufactured from 12 in by 12 in pieces of cardboard by cutting congruent squares from the corners and then folding up the sides. Find the dimensions of the box of greatest volume that can be made in this way.
a.) $8 \times 8 \times 2$ b.) $6 \times 6 \times 6$ c.) $10 \times 10 \times 1$ d.) $9 \times 9 \times 3$
- Which quadrant is NOT included in the solution of $\begin{cases} 3x + 4y > 12 \\ 5x - 6y \geq -30 \end{cases}$
a.) I b.) II c.) III d.) IV
- Ninety-nine girls and one boy are in a college math class. How many girls must leave the room so that the percentage of girls becomes 98 percent?
a.) 1 b.) 2 c.) 49 d.) 50

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10. The median of a set of data containing 9 items was found. Four data items were added to the set. Two of these items were greater than the original median, and the other 2 were less than the original median. Which of the following statements must be true about the median of the new data set?
- a.) It is the average of the 2 new lower values. b.) It is the same as the original median.
c.) It is the average of the 2 new higher values. d.) It is greater than the original median.
11. A fence is being built to enclose a backyard. The yard is 150 feet wide by 325 feet long. The back of the house (325 ft) will act as one side of the fence. Fencing sells for \$13 per foot. Which of the following will be the cost of the fence?
- a.) \$6175 b.) \$8125 c.) \$10400 d.) \$12350
12. What is the diameter of the largest table top that can pass through a doorway 74 cm wide and 201 cm high?
- a.) 214 cm b.) 201 cm c.) 74 cm d.) 220 cm
13. A wall has been built in such a way that the top row contains one block, the next lower row contains 3 blocks, the next lower has 5 blocks, and so on, increasing by 2 blocks in each row. How many rows high is the wall if there are a total of 900 blocks used?
- a.) 450 b.) 50 c.) 30 d.) 15
14. Barb is going to cover a rectangular area 8 feet by 10 feet with rectangular paving blocks that are 4 inches wide by 8 inches long by 2 inches thick to make a flat patio. What is the minimum number of paving blocks she will need if all the paving blocks will face the same direction? (Barb will not cut any of the paving blocks.)
- a.) 80 b.) 360 c.) 601 d.) 960
15. An airplane is at 500 feet above ground at 2 seconds, and is 900 feet at 10 seconds. What is the airplane's change in altitude over time?
- a.) $\frac{1}{2}$ ft/sec b.) 400 ft/sec c.) 2 ft/sec d.) 50 ft/sec
16. Three species of songbirds live in a certain plot of trees, totaling 120 birds. If species A has three times as many birds as species B, which has half as many birds as species C, how many birds belong to species C?
- a.) 20 b.) 30 c.) 40 d.) 60
17. Your teacher has decided that you do not have to take the final exam this semester if you have achieved a test average of 85. So far your first four tests scores are 92, 75, 88, and 74. What will you have to score on the fifth test to be exempt from the final?
- a.) 85 b.) 11 c.) 100 d.) 96
18. A circle is inscribed in a square. What is the probability to the nearest thousandth that a point inside the square is also inside the circle?
- a.) 0.318 b.) 0.637 c.) 0.785 d.) 0.858
19. A ramp for wheelchair access to the gym has a slope of 5%. The entire ramp is built on level ground, and the entrance to the gym is 2 feet about the ground. What is the horizontal distance, in feet, between the ends of the ramp?
- a.) 4 b.) 10 c.) 40 d.) 100

TEAM 9-10 2011 Answer Key

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