



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2011 MATH CONTEST
APPLIED

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

- If an edge of a cube is tripled, its volume is multiplied by:
a.) $\frac{1}{3}$ b.) 3 c.) 9 d.) 27
- A line is drawn through the vertex of a right angle. One angle that is formed by the line and a side of the right angle measures 32° . What is the measure of the other acute angle formed?
a.) 148° b.) 58° c.) 328° d.) 45°
- Mark and Juanita own a sandwich shop. They offer 3 kinds of bread, 5 kinds of meat, and 3 kinds of cheese. Each type of sandwich has a combination of exactly 3 ingredients: 1 bread, 1 meat, and 1 cheese. How many types of sandwiches are possible?
a.) 11 b.) 15 c.) 30 d.) 45
- Rookie police officers have to buy duty shoes at the full price of \$84.50, but officers who have served at least one year get a 15% discount. Officers who have served at least three years get an additional 10% off the discounted price. How much does an officer who has served at least three years have to pay for shoes?
a.) \$63.78 b.) \$64.64 c.) \$71.83 d.) \$72.05
- The height of a certain tree in a forest is proportional to its circumference. A certain tree has a circumference of 20 inches and has a height of 25 feet. What is the height of a tree in feet, with a circumference of 14 inches?
a.) 17.5 b.) 11.2 c.) 35.7 d.) 10.4
- The vertex angle of an isosceles triangle has a measure of 170° . What are the measures of the other two angles?
a.) 10, 10 b.) 85, 5 c.) 5, 170 d.) 5, 5
- At a school picnic, 1 junior and 2 seniors will be selected to lead the activities. If there are 125 juniors and 100 seniors at the picnic, how many different 2-person combinations of 1 junior and 1 senior are possible?
a.) 100 b.) 125 c.) 225 d.) 12500
- A polygon is a closed plane figure composed of connected line segments. How many connected segments must there be to make a polygon?
a.) 3 or more b.) 4 or more c.) 5 or more d.) 6 or more
- Find the approximate length of a side of a square whose diagonal is 25?
a.) 5 b.) 7.1 c.) 17.7 d.) 50
- Rhombus ABCD has two vertices A and C with coordinate points A(6, 2) and C(8, -3). Find the slope of \overline{DB} ?
a.) $-\frac{5}{2}$ b.) $\frac{2}{5}$ c.) $-\frac{1}{2}$ d.) $-\frac{1}{14}$
- A builder has 27 cubic feet of concrete to pave a sidewalk whose length is six times its width. The concrete must be poured six inches deep. How long is the sidewalk?
a.) 9 feet b.) 12 feet c.) 15 feet d.) 18 feet
- Lines A and B are parallel to each other. Lines C and D are also parallel to each other, and in addition, both are perpendicular to lines A and B. Suppose line E is a transversal to line A. What other line(s) must line E cross?
a.) Line B b.) Lines B and C c.) Lines B and D d.) Lines C and D

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13. The length of a median of a trapezoid is 18 m and one of the bases is 23 m, what is the length of the other base?
a.) 20.5 m b.) 20 m c.) 13 m d.) 15 m
14. A 6-inch by 8-inch rectangle is inscribed in a circle. What is the area of the circle, in square inches?
a.) 5π b.) 16π c.) 25π d.) 48π
15. If the ratio of the volumes of two similar pyramids is 125:64 and the edge length of the first is 11, what is the edge length of the second.
a.) 12.2 b.) 8.0 c.) 22.0 d.) 8.8
16. A pole that casts a 15 foot long shadow stands near an eight foot high stop sign. If the shadow cast by the sign is three feet long, how high is the pole?
a.) 40 ft b.) 30 ft c.) 24 ft d.) 45 ft
17. A line contains the points A, B, C, and D. Point B is between points A and C. Point D is between points C and B. Which of the following inequalities must be true about the lengths of these segments?
a.) $CD < BC$ b.) $BD < AB$ c.) $BD < CD$ d.) $CD < AB$
18. Justin walks to school in a straight line; the distance is seven blocks. The first block is 97 feet long; the second and third blocks are 90 feet long; the fourth, fifth, and sixth blocks are 110 feet long. The seventh block is congruent to the second block. How far does Justin walk?
a.) 770 ft b.) 717 ft c.) 704 ft d.) 697 ft
19. Oddly, the town of Abra lies half in one state and half in another. To make it even more confusing, the straight line that divides the states runs along Sandusky Street. What is the relationship of the houses at 612 Sandusky, 720 Sandusky, and 814 Sandusky?
a.) The houses are congruent. b.) The houses are collinear.
c.) The houses are segmented. d.) The houses are equilateral.
20. A girl is mowing a rectangular lawn that is 40 ft long and 30 ft wide. All that remains is a section that is 20 ft by 15 ft. What percent has been mowed?
a.) 25% b.) 50% c.) 66% d.) 75%
21. What is the distance between (-3, 5) and (4, -1).
a.) $\sqrt{13}$ b.) $\sqrt{17}$ c.) $\sqrt{85}$ d.) 13

APPLIED 2011 ANSWER KEY

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