



MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2012 MATH CONTEST

Applied Math

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

- The price of admission to the water park for Billy's class of 24 students is \$447.60. Bobby's class of 22 students is also going to the water park. What is the total cost for both classes?
(A) \$857.90 (B) \$895.20 (C) \$410.30 (D) \$622.16
- The sale price of an *i* Pod is \$115.39. This is a 15% discount from the original price. Find the original price.
(A) \$155.25 (B) \$135.75 (C) \$132.70 (D) \$98.08
- A rectangle is 4 cm longer and 2 cm narrower than a square with the same area. Find the dimensions of the rectangle.
(A) 9 cm by 4 cm (B) 8 cm by 2 cm (C) 16 cm by 3 cm (D) 4 cm by 4 cm
- Find the area of the quadrilateral with vertices at (5,8), (2,3), (6,3), (9,8).
(A) 12 square units (B) 10 square units (C) 18 square units (D) 20 square units
- Write the equation of the line perpendicular to $4x + 3y = 3$ that passes through the point (4,2).
(A) $y = \frac{3}{4}x - 1$ (B) $y = \frac{4}{3}x - 1$ (C) $y = -\frac{3}{4}x + 1$ (D) $y = -\frac{4}{3}x - 1$
- The measures of the angles of a triangle are x , $13x$, and $3x + 10$. What is the measure of the largest angle?
(A) 10° (B) 130° (C) 35° (D) 40°
- A right triangle has sides of length x , $x + 7$ and $x + 8$. Find the area of the triangle.
(A) 30 square units (B) 60 square units (C) 15 square units (D) 45 square units
- If $f(x) = 2x^2 + 2x - 7$, find $f(-3)$.
(A) -19 (B) -31 (C) -5 (D) 5
- A car traveling at velocity v (miles/hour) needs distance d (feet) to stop. If $d = 0.05v^2 + v$, at what speed will it take more than 100 feet to stop the car.
(A) 30 mph (B) 33 mph (C) 35 mph (D) 36 mph
- A box contains eight cards. Two of the cards are black on both sides, three of the cards are red on both sides and the remaining cards are red on one side and black on the other side. If you pick a card at random from the box and see that the side facing you is black, what is the probability that the other side is black.
(A) $\frac{5}{8}$ (B) $\frac{2}{5}$ (C) $\frac{3}{5}$ (D) $\frac{1}{4}$
- How many times larger is the area of a 48" diagonal TV than the area of a 24" diagonal TV?
(A) 2 (B) 4 (C) 8 (D) 16

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12. Student Fred walks south a distance x miles and then east the same distance x miles. His phone GPS app then tells him he is approximately 2.12 miles from where he started. **Approximately** how far did he walk south?
(A) 1.06 miles (B) 2.12 miles (C) 1.12 miles (D) 1.50 miles
13. If the measure of an interior angle of a regular polygon is 120 degrees, how many sides does the polygon have?
(A) 5 (B) 6 (C) 7 (D) 8
14. In triangle ABC, point D is the midpoint of segment BC, which is 12 units long. Segment DA is 6 units long and is perpendicular to segment BC. What is the measure of angle BAC?
(A) 60° (B) 30° (C) 90° (D) 45°
15. Student Harvey's average on his first three algebra tests is 85%. His average on the next 2 tests is 95%. What is his overall average on all 5 tests?
(A) 88% (B) 89% (C) 90% (D) 91%
16. If a graph of the results of the Human Genome Project is 2 parallel lines, then the product of the slopes of the 2 lines can be which of the following:
(A) -1 (B) 0 (C) $-\frac{1}{2}$ (D) -2
17. Given the area of one face of a cube is 16 inches squared, what is the volume of the cube?
(A) 256 inches cubed (B) 64 inches cubed (C) 32 inches cubed (D) 16 inches cubed
18. Starting from the origin, you hike 4 miles north and then 6 miles west. Your friend hikes 4 miles east and then 2 mile south. If you both now walk directly towards each other at the same speed, where will you meet?
(A) (-1, 1) (B) (-2, 2) (C) (1, 1) (D) (2, 2)
19. Tony's Ice Cream Shop offers plain, sugar or waffle cones with 2 scoops of 32 different flavors. You may order each scoop as a different flavor or 2 of the same flavor. How many different orders could be placed?
(A) 67 (B) 192 (C) 2976 (D) 3072
20. The area of a square is $9x^2 - 24x + 16$ square feet. If x is a positive integer, what is the least possible measure of the perimeter of the square?
(A) 4 ft. (B) 20 ft. (C) 16 ft. (D) 8 ft.
21. If you randomly pick 2 letters from this quote: "*Statistics are no substitute for judgment.* ", what is the approximate probability of picking a t both times if the first letter picked is removed.
(A) 0.3 (B) 0.03 (C) 0.4 (D) 0.04
22. The ratio of the measures of the three angles of a triangle is 3:4:5. Find the measure of the smallest angle.
(A) 15 (B) 75 (C) 60 (D) 45
23. Sophia is flying a kite and all 280 feet of string are being used. Her friend Alejandra is directly under the kite and is 1200 inches from Sophia. Approximately how high is the kite?
(A) 151 ft. (B) 261 ft. (C) 40 ft. (D) 1400 ft.

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Answers

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