

2024 8th Grade Math Contest

- 1) Three consecutive whole numbers have a sum of 144. What is the product of the three numbers?
- A) 20,736
 - B) 110,400
 - C) 110,544
 - D) 110,592
 - E) 124,950
- 2) Today is Thursday. That means 150 days from now will be a:
- A) Saturday
 - B) Sunday
 - C) Monday
 - D) Tuesday
 - E) Wednesday

- 3) In mathematics, the exclamation point has a special meaning. Here are two examples:

1. $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

2. $8! = 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 40,320$

Which of the following situations would have $15!$ possibilities?

- A) The number of arrangements of 15 people standing in a line
 - B) The number of access codes with 15 digits
 - C) The number of results of choosing one block from a set of 15 blocks
 - D) The number of arrangements of the letters in the word *accomplishments*
 - E) The number of 15-member groups chosen from a group of 100 people
- 4) A triangle has sides of length 12 meters, 12 meters, and 15 meters. This triangle is:
- A) Right
 - B) Obtuse
 - C) Acute
 - D) Equilateral
 - E) None of these
- 5) If my watch stopped running 475 minutes past 11:00 AM, it stopped running at:
- A) 3:45 PM
 - B) 4:15 PM
 - C) 6:45 PM
 - D) 6:55 PM
 - E) 7:55 PM

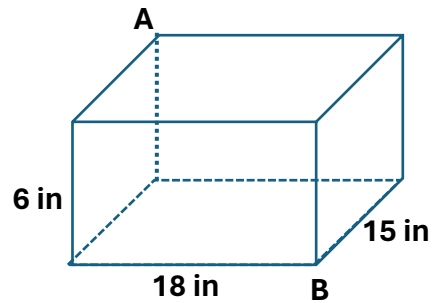
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- 6) There are 783 pencils and 522 pens to put into bags. Each bag must be filled with x pencils and y pens. There cannot be any pencils or pens left over. If the largest number of bags possible are filled, what is $x + y$?

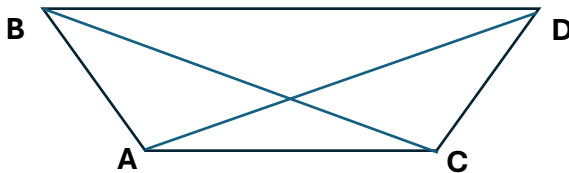
A) 261
B) 45
C) 29
D) 27
E) 5

- 7) A rectangular box has dimensions 18 inches by 15 inches by 6 inches as shown in the diagram. A spider creates a web strand that reaches from the upper corner of the box to the opposite lower corner, from point A to point B. What is the length of the spider's web strand to the nearest inch?

A) 16 inches
B) 19 inches
C) 23 inches
D) 24 inches
E) 39 inches



- 8) In the isosceles trapezoid shown below the measure of angle CAD is 21° and the measure of angle ABC is 22° . What is the measure of angle ACD?



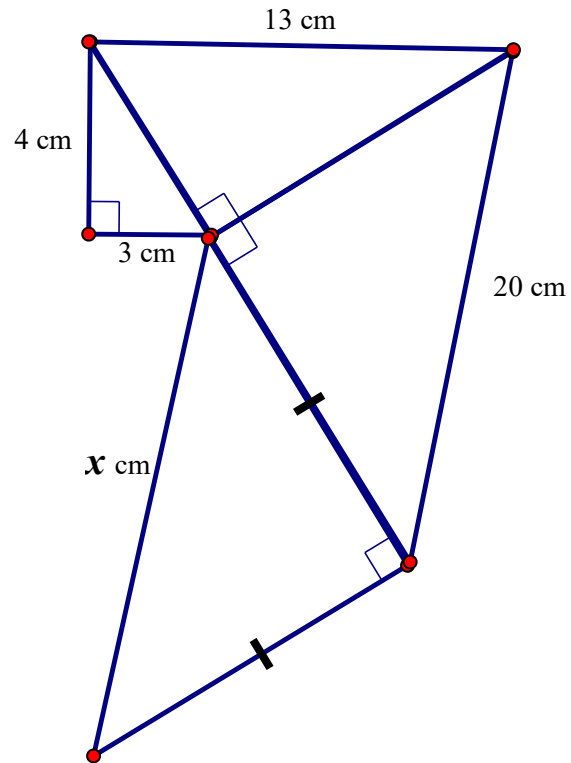
A) 116°
B) 121°
C) 122°
D) 131°
E) 137°

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- 9) Quinton buys a Tesla Model Y for \$64,000. Suppose the car loses 20% of its value every year. How much will the Tesla be worth 5 years later?
- A) \$0.00
 - B) \$12,800.00
 - C) \$20,971.52
 - D) \$26,214.40
 - E) \$51,200.00

- 10) In the diagram below, four right triangles are shown. Find the value of x .

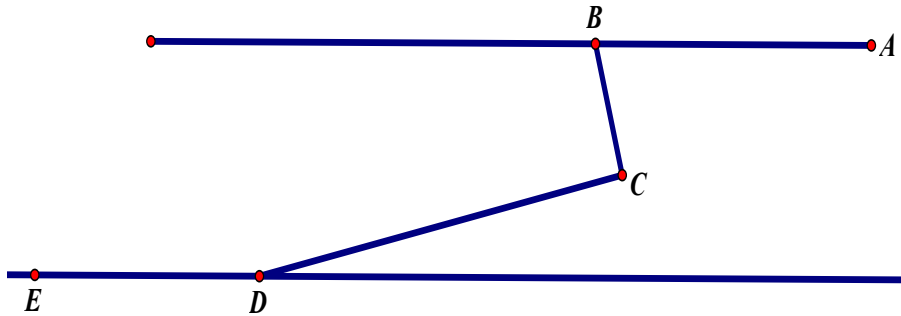
- A) 20
- B) 24
- C) $16\sqrt{2}$
- D) $18\sqrt{2}$
- E) $20\sqrt{2}$



- 11) Two cones are constructed with congruent bases, but one cone is two-thirds of the height of the other. What is the ratio of the volume of the taller cone to the shorter cone?
- A) 2:3
 - B) 3:2
 - C) 4:9
 - D) 9:4
 - E) 27:8

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12) In the diagram, $m\angle ABC = 75^\circ$ and $m\angle EDC = 168^\circ$. Line BA is parallel to line ED. Find $m\angle BCD$.

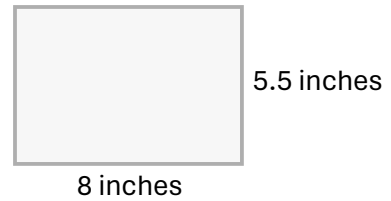


- A) 75°
B) 105°
C) 87°
D) 93°
E) 90°
- 13) Hitesh drove 42 miles from Clarksville to Nashville at an average speed of 65 miles per hour. On her way back home to Clarksville on the same route, she got stuck in a traffic jam and only averaged 35 miles per hour. What was her average speed for the entire trip?
- A) 30.5 mph
B) 45.5 mph
C) 46.5 mph
D) 48.5 mph
E) 50.5 mph
- 14) Your test scores for your history class this term are: 76, 84, 87, 80, and 95. You have one more test for this term, and you would like your average to be at least 85 points when rounded to the nearest whole number. What is the lowest score which would accomplish this goal?
- A) 85
B) 90
C) 82
D) 88
E) 95

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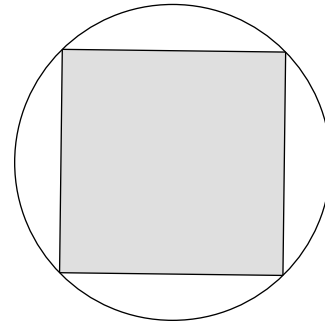
- 15) The sheet of paper pictured below is a net for the lateral sides of a right circular cylinder. The cylinder is made by taping the two sides measuring 5.5 inches together with no overlap. What is the volume of the resulting right circular cylinder in cubic inches?

- A) 28 cubic inches
- B) 46 cubic inches
- C) 48 cubic inches
- D) 63 cubic inches
- E) 146 cubic inches



- 16) A dart is randomly thrown at the circular dartboard in the diagram below. The square is inscribed in the circle. What is the probability that the dart hits a point inside the square given that it hits the circular dartboard?

- A) $\frac{1}{4}$
- B) $\frac{2}{3}$
- C) $\frac{2}{2\pi}$
- D) $\frac{2}{\pi}$
- E) $\frac{1}{2}$



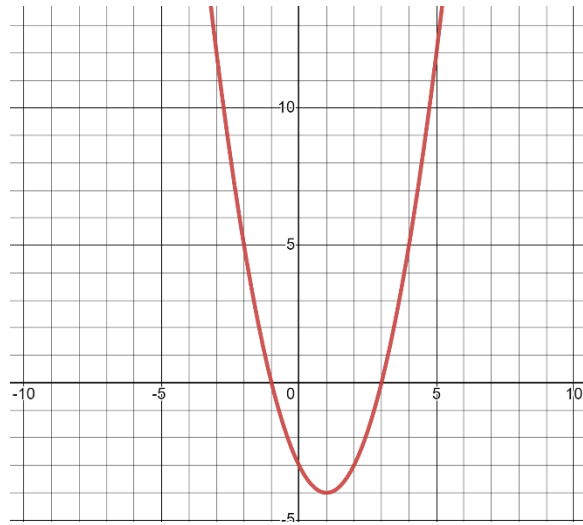
- 17) For the system of equations below to have no solutions, what is true about the value of the coefficient k ?

$$\left\{ \begin{array}{l} \text{i. } 3x - 4y = 6 \\ \text{ii. } kx - 8y = 12 \end{array} \right.$$

- A) k must equal 3
- B) k must equal 6
- C) k must equal $\frac{-1}{3}$
- D) There is more than one value of k that makes the system have no solutions.
- E) There are no values of k that make the system have no solutions.

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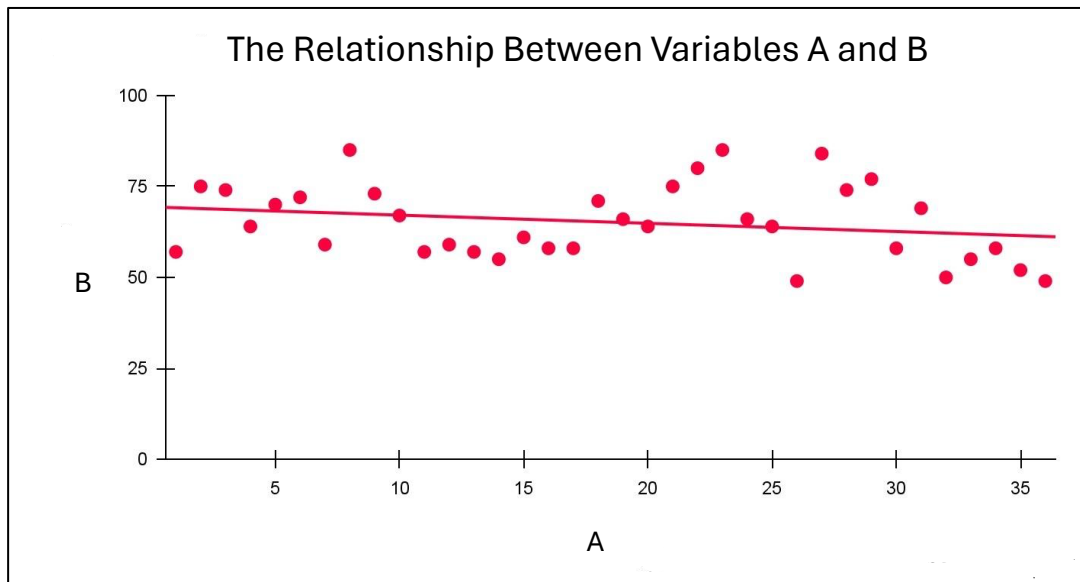
18) Consider the graph of the function $f(x)$ as shown below. The value of $f(2) =$



- A) -1.5 and 3.5
- B) -3
- C) 0
- D) -4
- E) 5

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- 19) The scatterplot below shows the relationship between two variables, A and B. A regression line (or line of best fit) was drawn and is included on the scatterplot.



How would you assess the regression line as a model of association between the two variables, A and B?

- A) It shows a strong positive association
 - B) It shows a moderate positive association
 - C) It shows a strong negative association
 - D) It shows a moderate negative association
 - E) It shows no association between the two variables at all.
- 20) You and your friends are playing a game where you roll one die (six-sided number cube) three times. What is the probability of getting a roll of 5 three times in a row?
- A) $5 \cdot 5 \cdot 5$
 - B) $6 \cdot 6 \cdot 6$
 - C) $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}$
 - D) $\frac{1}{6} \cdot \frac{1}{5} \cdot \frac{1}{4}$
 - E) $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

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- 21) You start with \$12 in your checking account and you add \$15 every week from your part-time jobs that you do for your neighbors. You have a goal of saving \$250 for a purchase you wish to make in a few months. Let y represent the amount of money in the account and the independent variable is time in weeks. If you write a linear equation to model this situation, which values represent the slope and y -intercept?
- A) 12 is the slope and 250 is the y -intercept.
 - B) 12 is the slope and 15 is the y -intercept.
 - C) 15 is the slope and 12 is the y -intercept.
 - D) 15 is the slope and 0 is the y -intercept.
 - E) 250 is the slope and 15 is the y -intercept.

- 22) Evaluate the following expression and round your answer to the nearest thousandth:

$$\frac{1.6 \times 10^3}{(-4 \times 10^{-1})(2.8 \times 10^2)}$$

- A) 14.286
 - B) -14.286
 - C) -0.143
 - D) -1,120,000.000
 - E) -1,120.000
- 23) Which of the following expressions are equivalent to $2^{20} \cdot 8^{20}$?

- I. 16^{40}
- II. 8^{40}
- III. 2^{80}
- IV. 16^{20}

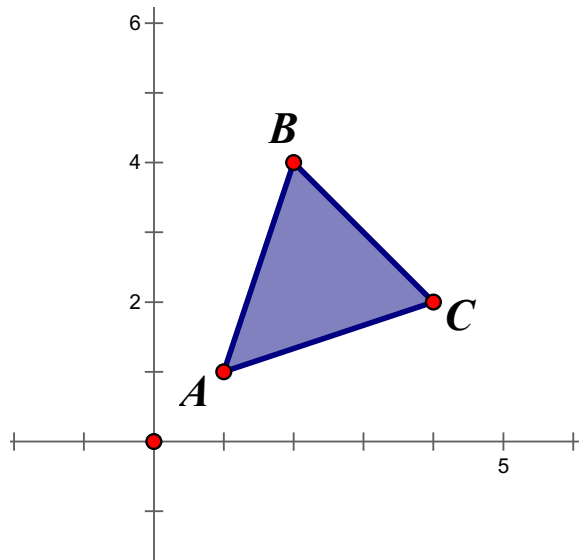
- A) only I
 - B) only II
 - C) only III
 - D) III and IV
 - E) none of these
- 24) You and your friend are roller-skating in a local park. There is a 15-mile path along the edge of the park that begins at the park's entrance. Your friend got to the park earlier than you and he is already 1 mile from the entrance. You call your friend and the two of you decide to start from your current locations. You roller-skate at a rate of 13 miles per hour, and your friend skates at 11 miles per hour. How long will it take for you to catch up to your friend? How far will each of you have skated?
- A) 6.5 minutes, 13 miles
 - B) 30 minutes, 6.5 miles
 - C) 10 minutes, 1 mile
 - D) 30 minutes, 2 miles
 - E) 60 minutes, 11 miles

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- 25) A 10-inch diameter cheese pizza at Luigi's cost \$8.99. Suppose the pizzeria would like to charge the same per square inch for all of their pizzas. How much should a 20-inch diameter pizza cost under this plan?
- A) \$12.99
 - B) \$17.98
 - C) \$18.99
 - D) \$35.96
 - E) \$44.95
- 26) If the measures of the 3 angles of a triangle are in a ratio of 2:3:4, then what kind of triangle is it?
- A) Acute
 - B) Right
 - C) Obtuse
 - D) Isosceles
 - E) Equilateral
- 27) A baker rolls out a rectangular sheet of dough 10 inches by 15 inches. Her cookie cutter is a circle with a $2\frac{1}{2}$ inch diameter. How many round cookies can she cut from the sheet of dough using that cookie cutter before re-rolling the dough?
- A) 7 cookies
 - B) 24 cookies
 - C) 30 cookies
 - D) 30.56 cookies
 - E) 96 cookies

- 28) Suppose $\triangle ABC$ were translated 3 units to the right, then reflected in the x-axis. The coordinates of the image of B would be:

- A) (-5, 4)
- B) (-4, 5)
- C) (2, -4)
- D) (5, 4)
- E) (5, -4)



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29) Simplify the expression: $\frac{(x^2y^3)^5}{(x^{-3}y^5)^2}$

A) $\frac{x}{y^2}$

B) $x^{16}y^5$

C) $x^{13}y$

D) $\frac{1}{x^4y^8}$

E) $(xy)^6$

30) Suppose $a \oplus b = \frac{a^3 - b^3}{a^2 + b^2}$. What would be the value of $5 \oplus -3$?

A) 2

B) 8

C) $\frac{19}{2}$

D) $\frac{49}{17}$

E) $\frac{76}{17}$