2024 6th Grade Math Contest

1) A frog has two eyes, two legs ending in feet, two arms ending in hands, and four fingers on each hand. There are 2 frogs in a box. What is the ratio of frogs to frog fingers?

A) 1:4
B) 4:1
C) 1:8
D) 8:1
E) 1:2

2) A car travels at a constant rate of 30 miles per hour. Express this rate as a ratio in the form of *time : distance* where time is in minutes and distance is in miles.

A) 2:1
B) 1:2
C) 1:30
D) 30:1
E) 1:1

3) Zane and Jada own a lawn mowing service. Together, they can mow 4 acres of land in 7 hours. They mow at the same pace. How long would it take Jada to mow 8 acres of land by herself?

A) 14 hours
B) 28 hours
C) 56 hours
D) 7 hours
E) 3 and a half hours

4) A serving size of macaroni and cheese is $\frac{1}{2}$ a cup. How many servings are in $7\frac{3}{4}$ cups of macaroni and cheese?

A) $7\frac{3}{8}$
B) $7\frac{6}{4}$
C) $8\frac{1}{2}$
D) $14\frac{3}{4}$
E) $15\frac{1}{2}$

5) Rhonda purchased 12 hamburgers for $28. Assuming the same price per hamburger, what would Rhonda pay for 15 hamburgers?

A) $2.50
B) $6.43
C) $32.00
D) $35.00
E) $43.00

6) What is the product of 1.00001 and 1.00002?

A) 1.0000300002
B) 1.00003
C) 1.0000300000
D) 1.0000200003
E) 1.0000100003

7) An *unordered pair* of numbers is just two numbers. Their order does not matter. The pair 3, 5 is the same pair as 5, 3. For this problem, consider only unordered pairs of *distinct* numbers. The pair 3, 5 is a pair of distinct numbers because 3 and 5 are different. The pair 3, 3 is not a pair of distinct numbers because 3 and 3 are the same. How many unordered pairs of distinct natural numbers are there so that 12 is the least common multiple of the pair?

A) 2
B) 4
C) 6
D) 7
E) 9

8) An airplane reaches cruising speed at 2:00pm. At 4:00pm the airplane has flown 380 miles at a constant speed. The pilot continues flying at the same speed until 5:00pm when she begins to slow down to land the airplane. The entire trip occurred in a single time zone, and there was no wind that day. How far did the plane travel at cruising speed?

A) 570 miles
B) 190 miles
C) 670 miles
D) 950 miles
E) 380 miles

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9) The Bateman Paving Company uses very large dump trucks. Each dump truck can hold enough asphalt to pave 2/3 of a mile of one lane of a highway. The company's asphalt loader is quite precise and can load any needed fraction of a dump truck load. Last Thursday the paving crew nearly completed a job, with only 4/5 of a mile of one lane left to pave on Friday. How many dump truck loads of asphalt should the company load on Friday to finish the job?

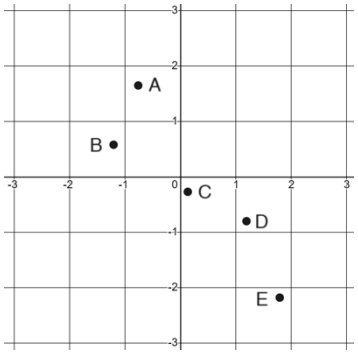
A) $1\frac{2}{15}$
B) $1\frac{1}{5}$
C) $\frac{8}{15}$
D) $1\frac{7}{15}$
E) $\frac{5}{6}$

10) The lowest point on Mars is the Hellas impact crater, approximately 4.4 miles below "sea level" (the average height of the surface of Mars). The highest point is Olympus Mons, whose difference in height from the Hellas impact crater is approximately 18 miles. Approximately how far above Martian "sea level" is Olympus Mons?

A) 22.4 miles
B) 13.6 miles
C) -13.6 miles
D) -22.4 miles
E) 18 miles

11) The point (4/3, -2) is closest to which of the following points?

A) The point A
B) The point B
C) The point C
D) The point D
E) The point E



12) Suppose x and y are two different rational numbers and that x < y. Which of the following must also be true?

A) $|x| < |y|$

B) $|y| < |x|$

C) $x < |y|$

D) $|x| < y$

E) $y < x$

13) Due to the directions of the streets in New York City, a taxi driver can only drive directly north, south, east, or west. The taxi driver has a map and wants to get from the position (-2,1) to (3,0). There are no one-way streets near where this trip will occur. One unit on the map corresponds to 1 mile. In terms of total distance traveled, what is the smallest distance the taxi driver can drive?

A) 6 miles
B) 2 miles
C) 4 miles
D) 7 miles
E) 3 miles

14) What is the last digit of 7^{2024}?

A) 1
B) 3
C) 5
D) 7
E) 9

15) What is the product of 2 and $\frac{4}{3}$?

A) $\frac{10}{3}$

B) $\frac{4}{3}$

C) $\frac{3}{2}$

D) $\frac{2}{3}$

E) $\frac{8}{3}$

16) Which of the following is NOT equivalent to $2x - 6$?

A) $2(x - 3)$
B) $2(x - 2) - 2$
C) $3(x - 2) - x$
D) $-2(x - 3) - 6$
E) $-2(3 - x)$

17) Kegan has two coupons. One is for 90% off any product. Another is for 60% off any product. Both coupons may be used on a single product. Kegan wants to buy a new toy which costs $19.99. Which coupon should Kegan use first to pay as little as possible for the toy?

A) Kegan should use the 90% off coupon first, because it takes off the largest amount.
B) Kegan should use the 60% off coupon first, because he should take off the largest amount second.
C) Kegan should use the 90% off coupon first, because 90% of $19.99 is less than $2.00.
D) Kegan should use the 60% off coupon first, because 60% of $19.99 is more than $2.00.
E) It doesn't matter what order Kegan uses them. The final price will be the same.

18) Solve the equation $x^3 - 3x^2 + 2x = 0$.

A) x = 0, x = 1, and x = 2 are all solutions.
B) x = 1, x = -3, and x = 2 are all solutions.
C) x = 0, x = 3, and x = -2 are all solutions.
D) x = 0, x = -1, and x = -2 are all solutions.
E) x = 0 is not a solution, but the equation has two other solutions.

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19) Uber charges $5 to send a car to pick you up, but an additional $2 per mile driving. If you're planning a trip of x miles, which of the following expressions represents the total cost in dollars?

A) $5x + 2$
B) $5x - 2$
C) $2x - 5$
D) $2x + 5$
E) $-2x - 5$

20) A batch of pancakes requires $\frac{3}{4}$ a cup of flour. Sara has 16 cups of flour. How many complete batches can she make?

A) 22
B) 21
C) 20
D) 7
E) 3

21) Suppose x represents the number of candy bars Peyton receives for Halloween. If $2 < x < 15$, how many possibilities are there for x?

A) 14
B) 13
C) 12
D) 11
E) 10

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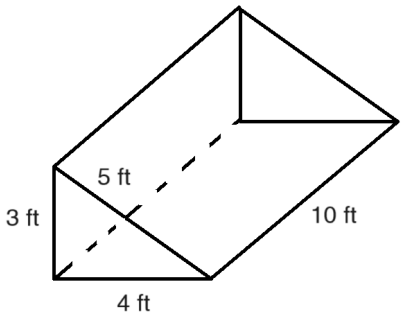
22) Korrine leaves her house at noon in Martin and travels at a constant speed to Memphis. She arrives two hours later. The distance from Martin to Memphis is 110 miles. If d denotes the distance (in miles), and t represents the time (in hours) after noon, which of the following equations relates d and t for Korrine's trip?

A) d = 55t
B) t = 55d
C) d = 110t
D) t = 110d
E) There is not enough information to answer this question.

23) Ava has a box in the shape of a right triangular prism with dimensions as shown below. What is the total area of all the faces?

A) 12 square feet
B) 120 square feet
C) 6 square feet
D) 126 square feet
E) 132 square feet



24) Suppose a rectangular prism has an area of 10 cubic meters. If all the side lengths are tripled, how many copies of the original rectangular prism will fit into the larger rectangular prism?

A) 3
B) 6
C) 9
D) 27
E) There is not enough information to answer this question.

25) A soccer ball is made of 12 pentagons and 20 hexagons. This ball is a bit deflated, so each of these polygons is flat. Each pentagon has an area of 2 square inches, while each hexagon has $\frac{6}{5}$ the area of a pentagon. Which of these represents the total surface area of the soccer ball?

A) 48 square inches
B) 72 square inches
C) 96 square inches
D) 24 square inches
E) 120 square inches

26) If w denotes the width of a rectangle, which expression describes "7 fewer than twice the width"?

A) $2w - 7$
B) $7 - 2w$
C) $2(w - 7)$
D) $2(7 - w)$
E) $2(7) - 1$

27) Which of the following is/are statistical questions?

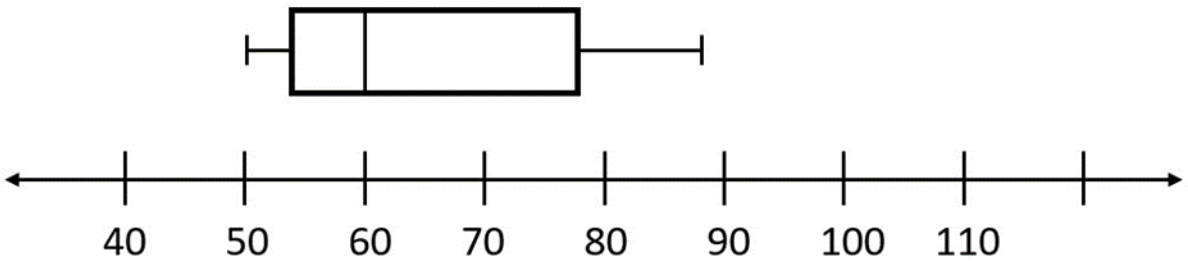
I. What is the height of your school principal?
II. What are the heights of the people in your school?
III. How many tiles are on the floor of your school?

A) Only I is a statistical question.
B) Only I and II are statistical questions.
C) Only II and III are statistical questions.
D) Only II is a statistical question.
E) Only III is a statistical question.

28) Consider the data set 21, 22, 22, 22, 25, 26, 26, 28, 31, 32, 32, 35, 38. Which of the following statements is true about the data set?

A) The range of the data set is 26.
B) The mode of the data set is 26.
C) The median of the data set is 26.
D) The mean of the data set is 26.
E) The maximum value of the data set is 26.

29) Which of the following is a reasonable statement about the data set represented by the boxplot which is shown below?



A) The interquartile range is 24.
B) The range is less than 20.
C) The median is at least 70.
D) The maximum value is 95.
E) The mean is 50.

30) An average score of 90% or higher at the end of the semester earns an A grade. A student named Jo has the following grades for the semester: 79%, 83%, 95%, 98%, 92%, 87%. All the grades are weighted equally. There is one more exam during the semester. What is the lowest score that Jo can earn on the last exam and earn an A for the semester?

A) 100%
B) 98%
C) 96%
D) 94%
E) It is not possible for Jo to earn an A for the semester.