

**TEAM NAME** \_\_\_\_\_

**14th Annual**

**Mathletes Challenge**

**2019**

**CHAMPIONSHIP ROUND**

**Test 1**



What is the decimal equivalent of the fraction  $\frac{8}{15}$  ?

- A 0.53
- B  $0.5\bar{3}$
- C  $0.\bar{53}$
- D 0.533



The circumference of a circle is  $15\pi$  centimeters. What is the area of the circle in terms of  $\pi$  ?

- A  $7.5\pi \text{ cm}^2$
- B  $15\pi \text{ cm}^2$
- C  $56.25\pi \text{ cm}^2$
- D  $225\pi \text{ cm}^2$



Bob buys eggs and potatoes at a store.

- He pays a total of \$25.92.
- He pays \$2.57 for the eggs.
- He buys 5 bags of potatoes that each cost the same amount.

Which equation can be used to determine the cost,  $x$ , of each bag of potatoes?

- A  $x = (25.92 - 2.57) \div 5$
- B  $x = 25.92 \div 5 + 2.57$
- C  $x = (25.92 + 2.57) \div 5$
- D  $x = 25.92 \div 5 - 2.57$

4

Three classes at a junior high school raised money to buy new computers.

- Ms. Moore's class raised \$249.00.
- Ms. Aguilar's class raised \$396.62 more than Ms. Moore's class.
- Mr. Barry's class raised \$430.43 less than Ms. Aguilar's class.

What is the total amount of money raised by all three classes?

- A \$215.19
- B \$464.19
- C \$1,076.05
- D \$1,109.81

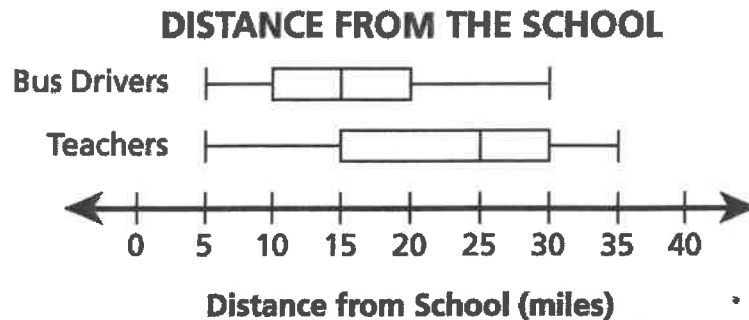
5

A farm grew 19.8 tons of wheat in 2013. The farm's wheat output increased by 9.8% from 2013 to 2014 and by 5.1% from 2014 to 2015. Which expression represents a strategy for estimating the total output of wheat, in tons, in 2015?

- A  $20 + 10 + 5$
- B  $20(10)(5)$
- C  $20 + 1.1 + 1.05$
- D  $20(1.1)(1.05)$



A principal gathered data about the distance, in miles, that his teachers and bus drivers live from the school. The box plots below show these data.



Based on the box plots, which statement is true?

- A The interquartile range of the distances for the bus drivers is twice the interquartile range of the distances for the teachers.
- B The range of the distances for the teachers is twice the range of the distances for the bus drivers.
- C The interquartile range of the distances for the bus drivers is 5 miles less than the interquartile range of the distances for the teachers.
- D The range of the distances for the teachers is 5 miles less than the range of the distances for the bus drivers.



At midnight, the temperature was  $-8^{\circ}\text{F}$ . At noon, the temperature was  $23^{\circ}\text{F}$ .

Which expression represents the increase in temperature?

- A  $-8 - 23$
- B  $|-8| - 23$
- C  $-8 - |23|$
- D  $|-8 - 23|$

**8**

Which expression is equivalent to  $-\frac{1}{3}(6x + 15) - 3$ ?

- A  $-2x + 12$
- B  $-2x + 2$
- C  $-2x - 2$
- D  $-2x - 8$

**9**

Josh has a rewards card for a movie theater.

- He receives 15 points for becoming a rewards card holder.
- He earns 3.5 points for each visit to the movie theater.
- He needs at least 55 points to earn a free movie ticket.

Which inequality can Josh use to determine  $x$ , the minimum number of visits he needs to earn his first free movie ticket?

- A  $55 \geq 3.5x + 15$
- B  $55 \geq 15x + 3.5$
- C  $55 \leq 3.5x + 15$
- D  $55 \leq 15x + 3.5$

10

Which expression is equivalent to  $(-18) - 64n$ ?

- A  $-2(9 - 32n)$
- B  $2(9 - 32n)$
- C  $-2(9 + 32n)$
- D  $2(9 + 32n)$

11

Verda used a sensor to measure the speed of a moving car at different times. At each time, the sensor measured the speed of the car in both miles per hour and kilometers per hour. The table below shows her results.

**RECORDED SPEEDS**

Speed (miles per hour)	Speed (kilometers per hour)
11.0	17.699
26.0	41.834
34.0	54.706

Based on her results, which statement describes the relationship between  $m$ , the speed of the car in miles per hour, and  $k$ , the speed of the car in kilometers per hour?

- A The relationship is proportional because the ratio of  $m$  to  $k$  is constant.
- B The relationship is not proportional because the ratio of  $m$  to  $k$  is constant.
- C The relationship is proportional because the difference between  $m$  and  $k$  is constant.
- D The relationship is not proportional because the difference between  $m$  and  $k$  is constant.

12

Which number represents the probability of an event that is very likely to occur?

- A 0.12
- B 1.3
- C 0.89
- D 0.09

13

Which expression is equivalent to  $n + n - 0.18n$ ?

- A  $1.18n$
- B  $1.82n$
- C  $n - 0.18$
- D  $2n - 0.82$

14

Nick is making bread dough.

- The recipe requires  $\frac{3}{4}$  cup of flour and  $1\frac{1}{8}$  teaspoons of salt.
- Nick wants to make the recipe using 1 cup of flour.

To maintain the ratio, how much salt is required when 1 cup of flour is used?

- A  $\frac{27}{32}$  teaspoon
- B  $\frac{2}{3}$  teaspoon
- C  $1\frac{1}{2}$  teaspoons
- D  $1\frac{7}{8}$  teaspoons

**15**

At a store, a hat has a regular price of  $x$  dollars. During a sale, the price of the hat is discounted by 20%. The expression  $0.8x$  describes the discounted price, in dollars, of the hat. Which expression also describes the discounted price, in dollars, of the hat?

- A  $0.2x$
- B  $x - 20$
- C  $x - 0.2$
- D  $x - 0.2x$

**16**

Howard has a scale model of the Statue of Liberty.

- The model is 15 inches tall.
- The scale of the model to the actual statue is 1 inch : 6.2 meters.

Which equation can Howard use to determine  $x$ , the height in meters, of the Statue of Liberty?

- A  $15x = 6.2$
- B  $6.2x = 15$
- C  $\frac{1}{6.2} = \frac{x}{15}$
- D  $\frac{1}{6.2} = \frac{15}{x}$



17

Triangle  $BCD$  is rotated  $180^\circ$  clockwise and then dilated by a factor of 4 centered at the origin. The resulting image is triangle  $B'C'D'$ . Which statement about the two triangles is true?

- A The area of  $\triangle BCD$  is 4 times the area of  $\triangle B'C'D'$ .
- B The perimeter of  $\triangle BCD$  is 4 times the perimeter of  $\triangle B'C'D'$ .
- C The corresponding sides of  $\triangle BCD$  and  $\triangle B'C'D'$  are congruent.
- D The corresponding angles of  $\triangle BCD$  and  $\triangle B'C'D'$  are congruent.

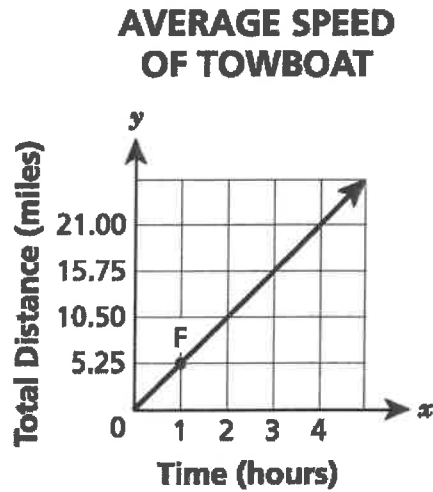
18

At a local basketball game, all tickets are the same price and all souvenirs are the same price. Mr. Smith bought 2 tickets to this basketball game and 1 souvenir for a total of \$17.25. Ms. Lockhart bought 5 tickets to the same game and 2 souvenirs for a total of \$42.00. How much was a ticket to this game?

- A \$2.25
- B \$7.50
- C \$8.50
- D \$9.75

19

The graph below shows the total distance, in miles, traveled by a towboat over time, in hours.



Which statement **best** describes the meaning of the coordinates of point F on the graph?

- A It shows the unit rate of the graph in hours per mile.
- B It shows the unit rate of the graph in miles per hour.
- C It shows the time, in hours, it takes the towboat to travel 1 mile.
- D It shows the distance traveled, in miles, by the towboat after 5.25 hours.

20

A computer program selects blue, red, or green as the background color each time the program is used.

- The program was used 45 times on the same computer in one week.
- Of those 45 times, a blue background appeared 12 times and a red background appeared 21 times.

Based on this information, which statement about the likelihood of the green background appearing the next time the program is used is true?

- A Green is just as likely as red or blue to appear.
- B Green is just as likely as blue to appear, but not as likely as red.
- C Green is not as likely as red or blue to appear.
- D Green is not as likely as blue to appear, but is as likely as red.

## 2019 Mathletes Challenge Round 3 Test 1 - Answer Key

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