2022 Mathletes Challenge Championship

You will have 20 minutes to complete this 20 question test. Good luck!

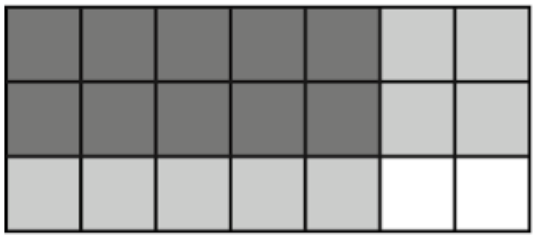
* Required

1. What is your team name? Example: Terry Team 2 *

Championship Test

2. Question 1 * 1 point

The model shown represents a multiplication equation.



Which multiplication equation does the model represent?

A. $\frac{2}{7} \times \frac{5}{3} = \frac{10}{21}$

B. $\frac{2}{7} \times \frac{5}{3} = \frac{19}{21}$

C. $\frac{5}{7} \times \frac{2}{3} = \frac{10}{21}$

D. $\frac{5}{7} \times \frac{2}{3} = \frac{19}{21}$

Mark only one oval.

- A
- B
- C
- D

3. Question 2 - Which answer choice below shows the order of teams from fastest to slowest? * 1 point

Four teams compete in a 200-meter swimming relay. The results are shown in the table.

Relay Results

Team	Time (seconds)
Dolphins	99.73
Orcas	100.60
Sharks	99.37
Rays	101.24

Mark only one oval.

- A - Rays, Orcas, Dolphins, Sharks
- B - Rays, Sharks, Orcas, Dolphins
- C - Sharks, Dolphins, Orcas, Rays
- D - Orcas, Dolphins, Rays, Sharks

4. Question 3 *

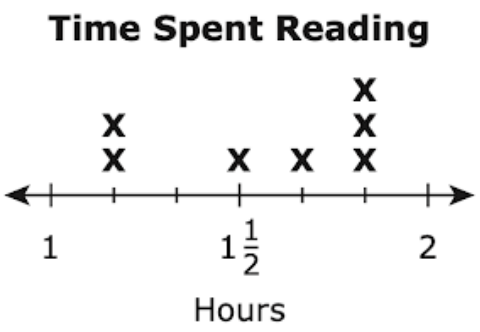
1 point

The numbers of hours that seven students spent reading are listed in this box.

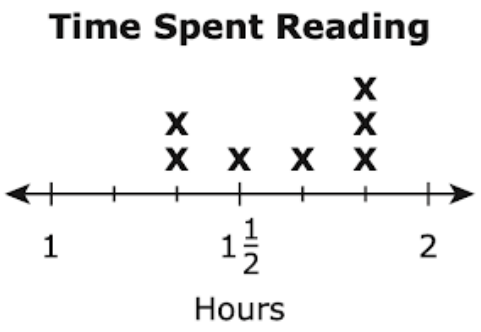
$1\frac{5}{6},\ 1\frac{1}{2},\ 1\frac{1}{3},\ 1\frac{5}{6},\ 1\frac{1}{3},\ 1\frac{5}{6},\ 1\frac{2}{3}$

Which of the following line plots shows the number of hours each student spent reading?

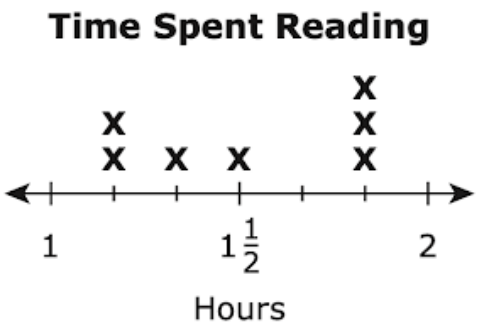
Ⓐ



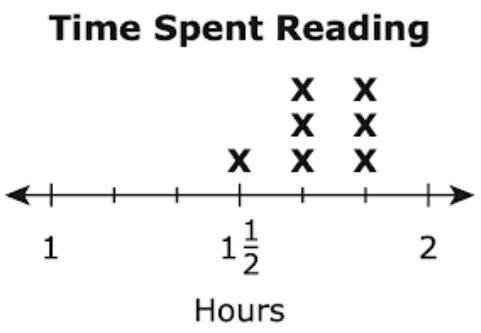
Ⓑ



Ⓒ



Ⓓ



Mark only one oval.

- A
- B
- C
- D

5. Question 4 * 1 point

Which of the following expressions is equivalent to 1,000,000,000?

Ⓐ 10^{11}

Ⓑ 10^{10}

Ⓒ 10^{9}

Ⓓ 10^{8}

Mark only one oval.

- A
- B
- C
- D

6. Question 5 * 1 point

A baker weighed four batches of cookie dough. The weights of the batches are shown.

- 2 pounds
- 46 ounces
- 3 pounds
- 26 ounces

Which of the these lists shows the weights in order from **least to greatest** value?

Ⓐ 26 ounces, 2 pounds, 46 ounces, 3 pounds

Ⓑ 26 ounces, 46 ounces, 2 pounds, 3 pounds

Ⓒ 2 pounds, 3 pounds, 26 ounces, 46 ounces

Ⓓ 2 pounds, 26 ounces, 3 pounds, 46 ounces

Mark only one oval.

- A
- B
- C
- D

7. Question 6 * 1 point

An after-school program has 24 sports video games students can play after they finish their homework. There are three types of sports games.

football: $\frac{1}{6}$ of $\frac{1}{2}$ of the video games

basketball: $\frac{1}{4}$ of $\frac{2}{3}$ of the video games

soccer: the remaining video games

How many video games are soccer games?

A. 2
B. 4
C. 18
D. 20

Mark only one oval.

- A
- B
- C
- D

8. Question 7 * 1 point

Emma and Bella collect bugs for a science project.

- On Monday, Emma collects 15 bugs, and Bella collects 3 times as many bugs as Emma collects.
- On Tuesday, Emma collects 6 bugs, and Bella collects 8 times as many bugs as Emma collects.

Which expression can be used to find the total number of bugs the girls collect on both days?

A. $(15 + 6) \times (3 + 8)$
B. $(15 + 3) \times (6 + 8)$
C. $[15 + (3 \times 15)] + [6 + (8 \times 6)]$
D. $[15 \times (3 + 15)] + [6 \times (8 + 6)]$

Mark only one oval.

- A
- B
- C
- D

9. Question 8 * 1 point

The numbers shown below are used at the beginning of two different patterns.

2, 6, ___, ___, ___, . . .

One pattern's rule is to add the same number each time. The other pattern's rule is to multiply by the same number each time. What is the **smallest** number greater than 6 that appears in both patterns?

A. 10
B. 12
C. 16
D. 18

Mark only one oval.

- A
- B
- C
- D

10. Question 9 *

1 point

What is the solution to the equation shown below?

$$\frac{2}{3}x + 5 = 1$$

A $x = -6$

B $x = 4$

C $x = -4.5$

D $x = 9$

Mark only one oval.

- A
- B
- C
- D

11. Question 10 * 1 point

Lamar has a container filled with nickels that have a value of $51.45. He has 4 other identical containers with nickels. Of the 4 other identical containers,

- 2 of them are full,
- 1 of them is $\frac{3}{4}$ full, and
- 1 of them is $\frac{1}{2}$ full.

Lamar estimates that the total value of all 5 containers of nickels is approximately $250. Which statement **best** explains why Lamar's estimate is likely an overestimate or an underestimate?

A. Lamar's estimate is likely an underestimate because 5 × $51 = $255.

B. Lamar's estimate is likely an underestimate because it is likely that at least one of the other 2 full containers contains more than $51.45.

C. Lamar's estimate is likely an overestimate because he has just over 4 full containers, and 4 × $50 = $200.

D. Lamar's estimate is likely an overestimate because it is doubtful that the other full containers are worth exactly $51.45.

Mark only one oval.

- A
- B
- C
- D

12. Question 11 *

1 point

A recipe calls for $2\frac{1}{3}$ cups of flour. Jane needs to make only half of the recipe. Which expression could Jane use to calculate the number of cups of flour she needs?

A. $2\frac{1}{3} + \frac{1}{2}$

B. $2\frac{1}{3} - \frac{1}{2}$

C. $2\frac{1}{3} \cdot \frac{1}{2}$

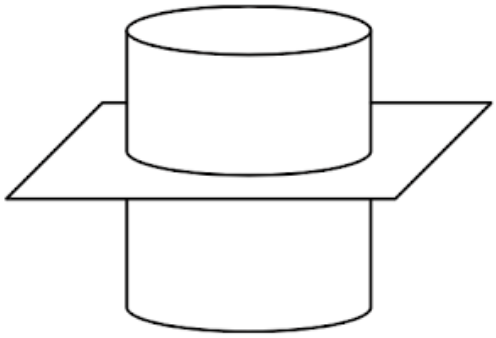
D. $2\frac{1}{3} \div \frac{1}{2}$

Mark only one oval.

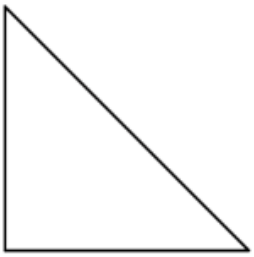
- A
- B
- C
- D

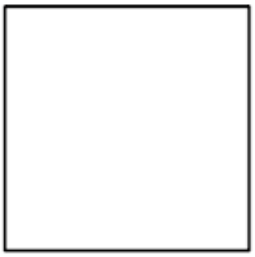
13. Question 12 * 1 point

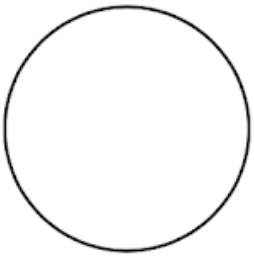
A cylinder is sliced parallel to its base, as shown.

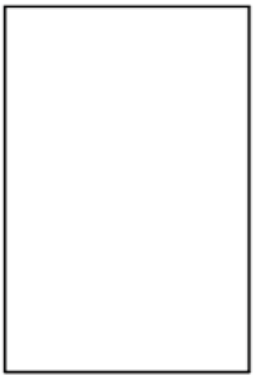


Which figure represents the two-dimensional cross section?

A. 

B. 

C. 

D. 

Mark only one oval.

- A
- B
- C
- D

14. Question 13 * 1 point

Whenever Hannah turns on her cell phone, it randomly shows a background image from a group of 6 images Hannah has selected. Of the 6 images Hannah has selected,

- exactly 2 are of her friends,
- exactly 3 are of her family members, and
- exactly 1 is of her pet dog.

What is the probability that the cell phone shows an image other than the pet dog the next time Hannah turns on her cell phone?

Mark only one oval.

- A - 1/3
- B - 2/4
- C - 5/6
- D - 6/8

15. Question 14 * 1 point

Chad is putting a frame around a picture. He needs to decide whether he wants the frame to be black or brown. He also needs to decide whether he wants the frame to be made of metal or of wood. Finally, he needs to decide whether he wants the picture covered with glass or with plastic. He makes a list of his options as shown.

{black, metal, glass}
{black, metal, plastic}
{black, wood, glass}
{black, wood, plastic}
{brown, metal, plastic}
{brown, wood, glass}
{brown, wood, plastic}

Which option did Chad forget to include in his list?

A. {brown, metal}
B. {brown, wood, plastic}
C. {brown, metal, black}
D. {brown, metal, glass}

Mark only one oval.

- A
- B
- C
- D

16. Question 15 * 1 point

A sprinkler waters a circular region in Jason's yard that has a radius of 15 feet. Rounded to the nearest square foot, what is the area of the circular region that is watered by the sprinkler?

A. 94
B. 148
C. 707
D. 2,827

Mark only one oval.

- A
- B
- C
- D

17. Question 16 * 1 point

In a mine, 0.6% of all the mined material is copper. The company that runs the mine needs the mine to produce more than 0.81 million tons of copper to make a profit this year. The mine has already produced 0.75 million tons of copper this year. The inequality below represents x, the additional millions of tons of material that need to be mined this year for the mine to make a profit.

$$0.75 + 0.006x > 0.81$$

Which inequality shows all the possible values of x?

A. $x > 1$
B. $x > 10$
C. $x > 26$
D. $x > 260$

Mark only one oval.

- A
- B
- C
- D

18. Question 17 * 1 point

There are 50 tickets in a jar. Each ticket is either red or blue. Jeanette randomly draws 10 tickets from the jar, counts the number of red tickets, and then replaces the tickets. She does this 8 times. The list shows how many red tickets Jeanette drew on each attempt.

3 4 6 7 3 4 2 3

What is the **best** estimate for the total number of red tickets in the jar?

A. 4
B. 20
C. 25
D. 32

Mark only one oval.

- A
- B
- C
- D

19. Question 18 * 1 point

A club is selling cookies to earn money. The club is going to donate $\frac{1}{4}$ of the money to charity and keep the rest. The total cookie sales are $367.20. Which expression could be used to determine the amount of money the club will keep?

A. $367.20 - 0.14(367.20)$
B. $367.20 - 0.25(367.20)$
C. $367.20 - 0.4(367.20)$
D. $367.20 - 2.5(367.20)$

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D

20. Question 19 * 1 point

Arie has a bag that contains 15 yellow marbles, 13 blue marbles, and 22 red marbles. Select the **two** statements that are true when Arie randomly draws 10 marbles from the bag.

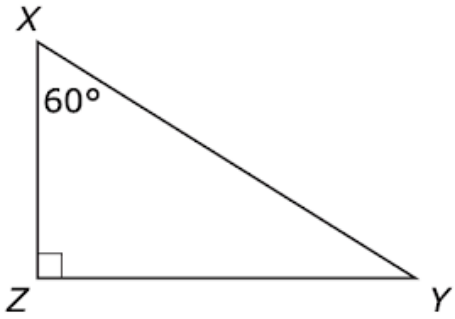
A. She is likely to draw all red marbles.
B. She is likely to draw more blue marbles than red marbles.
C. She is likely to draw more red marbles than yellow marbles.
D. She is likely to draw about the same number of yellow and blue marbles.
E. She is likely to draw more red marbles than yellow and blue marbles combined.

Check all that apply.

- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E

21. Question 20 * 1 point

Triangle *XYZ* and some of its measurements are shown.



Triangle *MNO*, not shown, is similar to triangle *XYZ*. What is the measure, in degrees, of $\angle N$?

A. 30°

B. 45°

C. 60°

D. 90°

Mark only one oval.

- A
- B
- C
- D