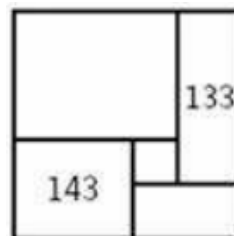


2022 Grade 7 Mathematics Contest

1) A square is covered with four rectangles and a smaller square as shown in the figure. The areas of two of the rectangles are 143 square units and 133 square units as indicated in the figure. All the sides are whole numbers greater than 1. What is the area of the small square?

- A) 4 square units
- B) 9 square units
- C) 16 square units
- D) 25 square units
- E) 36 square units



2) Given the following sequence of whole numbers: $X, 3, 7, 7, Y, 11, 15, Z$

Calculate the value of $-22X - Y + Z$

- A) 62
- B) -62
- C) 4
- D) -40
- E) 40

3) Pharaoh Amenhotep III would like to have his bathroom's floor covered with tiles. The dimensions of the rectangular bathroom are 20 ft. by 12 ft. He decides to go to *Tile and Error* in Cairo to see what they have in stock, and he is told that they only sell square tiles, but that these can be cut to size as long as the length is a positive integer. If, regardless of its size, each tile costs £9.99 before tax, and the sales tax in Cairo is 10%, what is the minimum he will have to pay for the new flooring? Note: All the tiles Amenhotep III buys have to be of the same size so the bathroom doesn't look too wacky!

- A) £149.85
- B) £150.00
- C) £159.84
- D) £164.84
- E) £175.82

4) Tracer took her dog for a 1-mile walk. They finished the first three quarters of the walk in two thirds of an hour. They finished the last quarter in one fifth of an hour. What was their mean speed for the walk?

- A) 1 mile per hour
- B) $1\frac{1}{8}$ miles per hour
- C) $1\frac{1}{4}$ miles per hour
- D) $1\frac{2}{13}$ miles per hour
- E) $2\frac{3}{8}$ miles per hour

5) Last year, yellow, red, and green shirts were the same price at a certain store. In the last months, these prices suffered some changes: yellow shirts' prices doubled and then were put on a 40% off sale; red shirts' prices increased by 50% and then were put on a 20% off sale; and green shirts were put on a 10% sale before their prices were increased by a third. Which of the following statements is true about the current prices of the shirts?

- A) Yellow shirts are more expensive than green shirts.
- B) Green shirts are cheaper than red shirts.
- C) Red shirts are cheaper than the other two colors.
- D) Both A) and C) are correct
- E) All shirts cost the same



6) The area of an isosceles triangle of height 1cm is 3 cm^2 , and its perimeter is 10 cm. What is the length of the equal sides of the triangle?

- A) 1 cm
- B) 2 cm
- C) 3 cm
- D) 4 cm
- E) Such a triangle doesn't exist

7) In a group of 40 students, 20 play tennis, 19 play volleyball, and 6 play both sports. How many students play none?

- A) 0
- B) 1
- C) 7
- D) 39
- E) It is impossible to know with the information provided.

8) Each month Anna pays a \$10 fee (which cannot be discounted) for her telephone service, and additionally each month she pays 3.5 cents per minute for calls and 5 cents per text. Last month, she won a promotion for 50% off on calls. Which of the following equations represents Anna's spending in dollars (C) for last month? Note: $m = \text{number of minutes}$, $t = \text{number of texts}$, $C = \text{total cost in dollars}$.

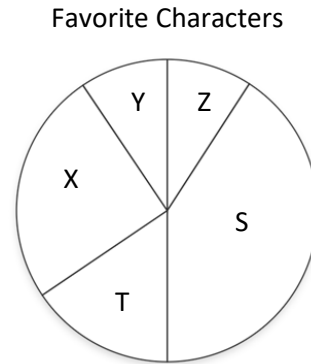
- A) $C = 5t + 1.75m + 10$
- B) $C = 0.05t + 0.0175m + 10$
- C) $C = 2.5t + 1.75m + 5$
- D) $C = 0.025t + 0.0175m + 5$
- E) $C = 0.025t + 0.0175m + 10$

9) *Doodle Pops* are now 25 percent off. Which of the following statements describes the sale price of *Doodle Pops* at the online store?

- A) $\frac{1}{25}$ of the regular price
- B) $\frac{1}{5}$ of the regular price
- C) $\frac{1}{4}$ of the regular price
- D) $\frac{1}{3}$ of the regular price
- E) $\frac{3}{4}$ of the regular price

10) Ms. O'Soup asked her 5th grade students to vote for their favorite Disney heroine or hero and recorded the results in a table. Then, she created a circle graph using the data but did not label it.

Favorite Heroine / Hero	
Character	Number of Votes
Mr. Incredible	3
Mulan	13
Elsa	5
Simba	8
Genie	3

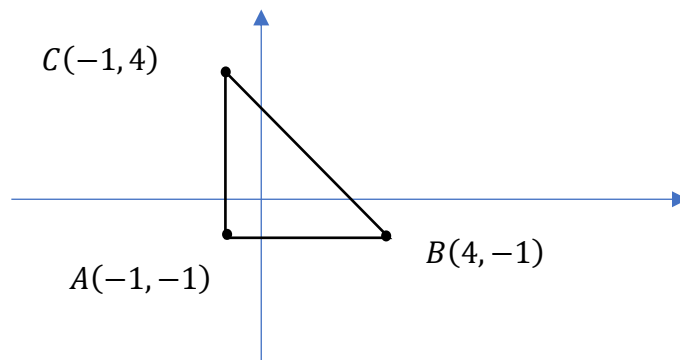


How could she label the different sections of the circle graph?

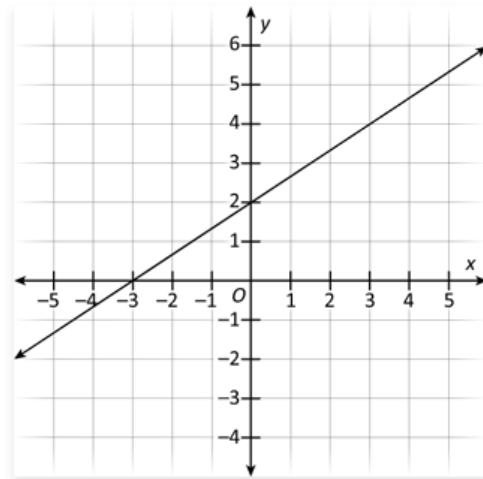
- A) X – Mr. Incredible; Y – Mulan; Z – Simba; S – Genie; T – Elsa
- B) X – Simba; Y – Mr. Incredible; Z – Elsa; S – Mulan; T – Genie
- C) X – Elsa; Y – Mulan; Z – Mr. Incredible; S – Genie; T – Simba
- D) X – Simba; Y – Genie; Z – Mr. Incredible; S – Mulan; T – Elsa
- E) X – Elsa; Y – Mr. Incredible; Z – Genie; S – Mulan; T – Simba

11) Calculate the area of the following triangle:

- A) 4.5 square units
- B) 8 square units
- C) 10 square units
- D) 12.5 square units
- E) 25 square units



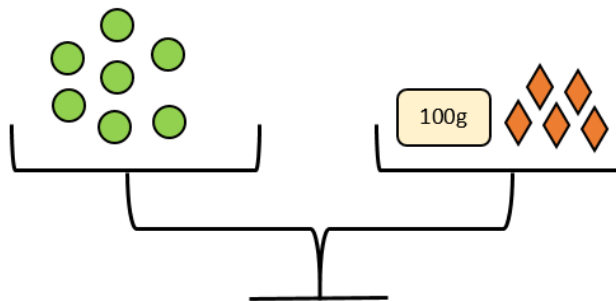
12) The following graph shows the line $y = \frac{2}{3}x + 2$ in the xy -plane. What are the x -intercept and y -intercept of the line?



- A) x -intercept $(2, 0)$, and y -intercept $(-3, 0)$.
- B) x -intercept $(2, 0)$, and y -intercept $(0, -3)$.
- C) x -intercept $(-3, 0)$, and y -intercept $(0, 2)$.
- D) x -intercept $(-3, 2)$, and y -intercept $(2, -3)$.
- E) x -intercept $(-3, 0)$, and y -intercept $(2, 0)$.

13) Mr. Barter used his scale to figure out the weights of some items. He knows that the ingot's weight is 100g, and that each ball weights 24.57g. What is the weight of a pair of diamonds, rounded to the nearest tenth of a gram?

- A) 28.8 g
- B) 14.4 g
- C) 11.2 g
- D) 5.7 g
- E) 5.6 g

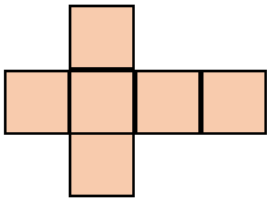


14) 🌀 , 😊 , and ♪ are variables. Which of the following expressions is equivalent to $-2\text{🌀}(5\text{😊} - \text{♪}) + 3\text{♪}\text{🌀} - \text{😊}$?

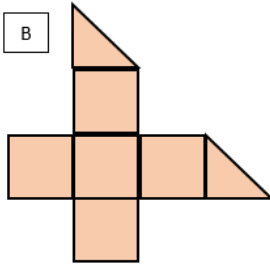
- A) $-10\text{🌀😊} + \text{🌀♪} - \text{😊}$
- B) $-10\text{🌀😊} + 5\text{🌀♪} - \text{😊}$
- C) $-11\text{🌀😊} + 2\text{🌀♪} + 3\text{♪}\text{🌀}$
- D) $-11\text{🌀😊} + 5\text{♪}\text{🌀} - \text{😊}$
- E) $-10\text{🌀😊} - \text{♪} + 3\text{🌀♪} - \text{😊}$

15) Which of the following nets cannot be folded into a cube?

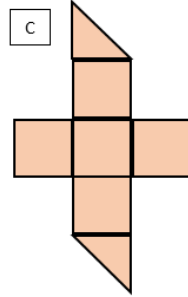
A



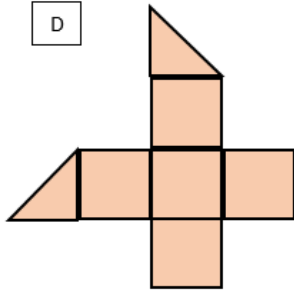
B



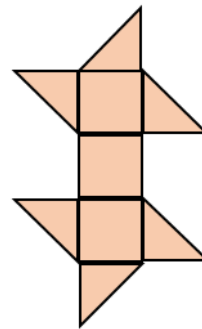
C



D



E

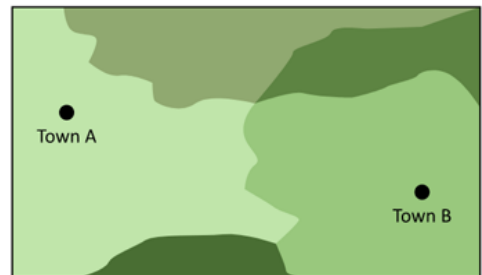


16) The circumference of a circular piece of wood is 36π cm. What is the diameter of the piece of wood?

- A) 36 cm
- B) 11.5 cm
- C) 11.4 cm
- D) 18 cm
- E) 5.75 cm

17) A map shows a region with two towns, A and B. On the map, 2 inches represents 15 miles. If the actual distance between the two towns is 67.5 miles, how far apart should the towns be on the map?

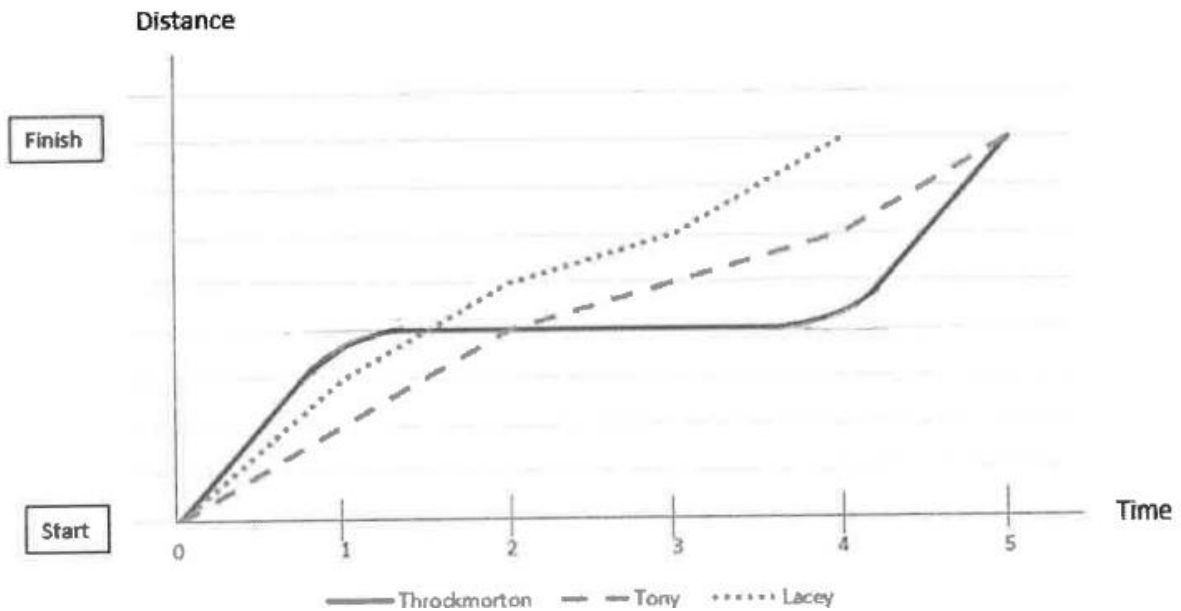
- A) 9 inches
- B) 0.22 inches
- C) 4.5 inches
- D) 0.11 inches
- E) The answer cannot be determined with the information provided



18) The number 980 is not a perfect square. What is the smallest positive integer we could multiply 980 by so that the resulting number is a perfect square?

- A) 5
- B) 10
- C) 35
- D) 70
- E) 980

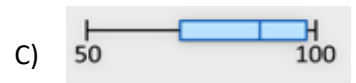
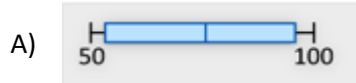
19) Your cousin Throckmorton, who is very good at skating, made it to the finals of a speed competition with Tony Hawk and Lacey Baker. The winner was the skater who reached the highest speed at any point of the course. On the following graph, the horizontal axis represents time in minutes. The vertical axis represents distance.



Who won the speed competition?

- A) Throckmorton
- B) Tony Hawk
- C) Lacey Baker
- D) Tony and Throckmorton tied for first.
- E) Lacey and Tony tied for first.

20) A group of herpetology students had to measure the length of some snakes for a class project. They started recording in the stem-and-leaf plot below but thought that a box plot would be more suitable for their project presentation. Which of the box plots could represent the same data as the stem-and-leaf plot?



E) None of the above

Stem	Leaf
5	0 3 3
6	4 5
7	
8	7 9
9	6 8
10	0

Key: 5 | 0 = 50

21) The ratio of boys to girls to adults at a school party was 6:5:2. There were 78 people at the party. How many of them were adults?

- A) 6
- B) 12
- C) 18
- D) 30
- E) 36

22) The stem-and-leaf plot below shows the number of seconds it took each student in a class of 18 to complete a word search. How many students took more than 25 seconds to complete the word search?

- A) 4
- B) 5
- C) 6
- D) 7
- E) 8

SECONDS TO COMPLETE WORD SEARCH	
1	2 4 5 8 9 9
2	0 1 1 1 2 5 7 7 7 7
3	2 3

Key: 1 | 2 represents a time of 12 seconds.

23) On the number line below, the arrow is pointing to a number that is closest to which of the following?

- A) 0.20
- B) 0.37
- C) 0.62
- D) 0.75
- E) 1.62

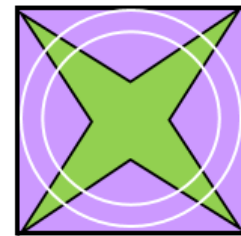


24) If a measurement of a box with rectangular sides is given as 48 cubic inches, what does the measurement represent?

- A) Distance around the top of the box
- B) Length of an edge of the box
- C) Surface area of the box
- D) Volume of the box
- E) Sum of the areas of three sides of the box

25) In the dart board pictured below, hitting the star gives you 3 points and hitting the board in the area outside the star gives you 1 point. However, if you hit between the two concentric rings you get double the points you would have gotten otherwise. If Ms. Fortune hits the board with two darts, which of the following cannot be her score?

- A) 5
- B) 7
- C) 9
- D) 10
- E) 12



26) Your grandfather Matt made three batches of 12 mini lemon bars each, and stored them in nine equal packs. If a serving is $\frac{3}{2}$ of a pack, how many servings did he end up with?

- A) 36
- B) 23.5
- C) 12
- D) 6
- E) 2.7

27) If nine less than the quotient of a number divided by negative 3 is at least 44, what do we know about such a number?

- A) It is at most 159
- B) It is at least 159
- C) It is at most -159
- D) It is at least -159
- E) It is between -159 and 159

28) If n is any integer, which of the following expressions must be an odd integer?

- A) $n + 1$
- B) $2n$
- C) $3n$
- D) $2n + 1$
- E) $3n + 1$

29) Two nomads were resting at an oasis when a third one, Nasrudin, showed up. Nasrudin asked them for some food since he had run out of it during his journey. The first two nomads shared some bread with Nasrudin so they all had the same amount to eat. The first nomad had 3 pieces of bread in his pouch, and the ratio of bread given to Nasrudin by him to the amount given to Nasrudin by the second nomad was 1:7. How many pieces of bread did the second nomad have in his pouch to begin with?

- A) 1
- B) 5
- C) 7
- D) 21
- E) None of the above are possible.

30) Which of the following formulas could we use to find the area of the figure below?

- A) $2r \left(\pi + \frac{h}{2} \right)$
- B) $r(\pi r + 2h)$
- C) $\frac{r}{2}(\pi r + 2h)$
- D) $\frac{r}{2}(\pi r + h)$
- E) $r(\pi r + h)$

