

INTERNATIONAL **STEM** OLYMPIAD  
**GRAND FINAL**

GRADES 3-4-5

**MATHEMATICS  
PAST PAPERS**



1.

Tara has 12 sets of car cards. Each set has exactly 18 cards. What is the total number of car cards Tara has?

- A) 116    B) 216    C) 316    D) 226

2.

What is the weight of 13 peanuts if each peanut weighs 10.6 grams?

- A) 137.80  
B) 137.18  
C) 138.18  
D) 137.78

3.

You have 18 balloons, and you want to give  $\frac{2}{3}$  of them to a friend and keep  $\frac{1}{3}$  for yourself. How many balloons would your friend get?

- A) 3    B) 6    C) 9    D) 12

4.

George bought 2 bottles of water, each with a capacity of 500 mL. After George and his sister each drank  $X$  mL of water from the bottles, they had 360 ml of water left in total. Find the value of  $X$ .

- A) 180    B) 230    C) 320    D) 640

5.

The ratio of contestants getting "A" in a math competition to contestants getting "B" is 3:5. If 24 contestants received "A", how many contestants received "B"?

- A) 37    B) 38    C) 39    D) 40

6.

Emma read 8 pages on Saturday, 12 pages on Sunday, 16 pages on Monday, and 20 pages on Tuesday. If this pattern continues, how many pages will Emma read on Wednesday?

- A) 24    B) 28    C) 30    D) 32

7.

Which two fractions are equivalent?

- A)  $\frac{2}{5}$  and  $\frac{8}{22}$       B)  $\frac{5}{10}$  and  $\frac{10}{40}$   
C)  $\frac{6}{12}$  and  $\frac{8}{24}$       D)  $\frac{4}{3}$  and  $\frac{12}{9}$

8.



David had 12 spacecrafts. Then David's sister took  $3x$  of the spacecrafts. Choose the expression to show the number of spacecrafts David has left.

- A) 12      B)  $12-3x$   
C)  $3x-12$       D)  $\frac{12}{3x}$

9.

There are 9 males and 6 females in your team. The team leader wants to appoint one person to be in charge of the attendance. What is the probability of this person being male?

- A)  $\frac{2}{5}$       B)  $\frac{2}{3}$       C)  $\frac{3}{5}$       D)  $\frac{3}{2}$

10.

When Olivia bought ice cream for \$15, she found herself with only \$8 remaining. How much money did she have initially?

- A) \$7    B) \$14    C) \$20    D) \$23

12.

Mary had 12 dollars last week. She sold books at the weekend. Now she has 36 dollars. How much money has she earned?

- A) 48    B) 34    C) 24    D) 14

11.

Robert has 4 blue, 6 purple and 10 pink shirts in the wardrobe. If a shirt is drawn at random, what is the probability of this shirt being blue?

- A)  $\frac{3}{10}$     B)  $\frac{1}{5}$     C)  $\frac{1}{2}$     D)  $\frac{3}{7}$

13.

What do the angles in an equilateral triangle measure?

- A) 30, 60, 90
- B) 45, 45, 90
- C) 60, 60, 60
- D) 30, 30, 120

14.

Janet is sitting on a chair facing a plane mirror. There is a clock behind her fixed on the wall. It is 10:10 now according to the clock. She sees the image of the clock in the mirror. What will be the time according to the clock reflected in the mirror?



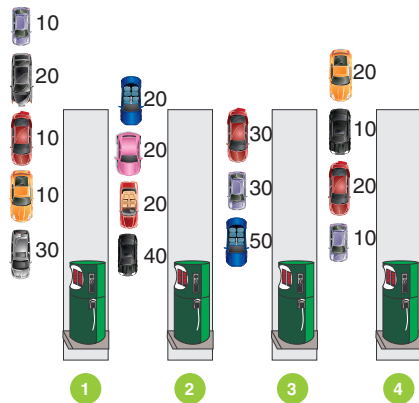
- A) 10:10
- B) 11:10
- C) 13:50
- D) 14:50

15.

Solve the following:  $23+50+9 \times 3$

- A) 100
- B) 90
- C) 80
- D) 70

16.



The cars are lined up at the gas station as shown in the diagram. The diagram also shows how many liters each vehicle will take. The time to fill 1 liter gas is 1 second, and each vehicle's payment time is 20 seconds. Which line would you prefer to refuel your vehicle earlier?

- A) line 1                      B) line 2  
C) line 3                      D) line 4

17.

A student solved 121 problems in math on Monday. On Tuesday he solved 34 more problems than he did on Monday. On Thursday, he solved 21 less problems than he did on Tuesday. On Saturday, he solved 14 more problems than he did on Thursday. How many problems did the student solve in total?

- A) 458    B) 558    C) 658    D) 858



18.

A bus departed from London at 11 pm with 30 passengers. An hour later, a few passengers got off in Cambridge. The number of passengers who boarded the bus in Cambridge was twice the number of passengers who got off the bus. If the bus has 38 passengers now, how many passengers got off in Cambridge?

- A) 4      B) 8      C) 16      D) 20

19.

Alex's Burgers cooks its burgers either well done or medium. The restaurant served 160 burgers last night. 25% of them were medium burgers. How many medium burgers did the restaurant serve?

- A) 60      B) 50      C) 40      D) 80

20.

A supermarket has some types of pasta that are Spaghetti, Penne and Ravioli in the ratio 5:3:7. If there are 15 Penne, then how many pastas are there in total?

- A) 51      B) 60      C) 75      D) 80

21.

Elvis wants to send one box of books to his mom by cargo. The box of books cannot exceed a weight of 8 kg. If each book has weight of 200g, what is the maximum number of books he can send? (Ignore the weight of empty box)

- A) 4    B) 40    C) 400    D) 4000

22.

What is the mathematical name of this figure?



- A) Sphere  
B) Cylinder  
C) Cone  
D) Can

23.

A triangle located in Quadrant III is reflected across the y-axis. Its reflection will be located in Quadrant ....

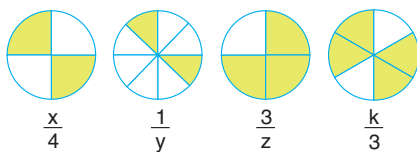
- A) I    B) II    C) III    D) IV

24.

Victor bought 2 adult tickets and 3 child tickets for the Central Park. Each adult ticket costs \$22 and each child ticket costs \$12. What is the average cost of the tickets?

- A) \$17    B) \$16    C) \$15    D) \$14

25.



The fractional values of the figures are written below them.

Accordingly, what's the sum of  $x + y + z + k$ ?

- A) 16    B) 12    C) 10    D) 8

26.

According to the latest sale offer at a tire shop, you can buy one tire and get the second one for half the price. If the price for one tire is \$90, and sales tax is 10%, how much does a customer pay for four tires including the tax?

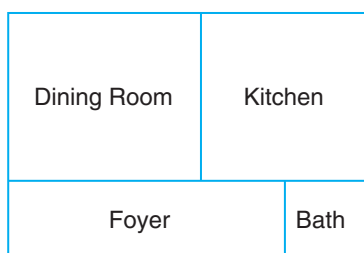
- A) \$127                      B) \$148  
C) \$214                      D) \$297

27.

Find the value of  $x$ , if  $\frac{3(x-2)}{5} = \frac{1}{2}$ .

- A)  $\frac{1}{2}$       B)  $\frac{2}{3}$       C)  $\frac{5}{6}$       D)  $\frac{17}{6}$

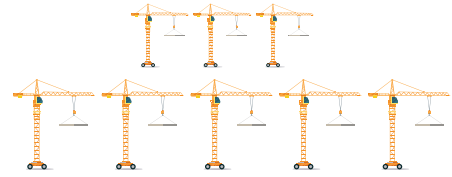
28.



The picture shows the rectangular floor plan of the first level of a house. Both the bathroom and the kitchen are square with areas of  $4 \text{ m}^2$  and  $64 \text{ m}^2$ , respectively. The dining room is rectangular with an area of  $96 \text{ m}^2$ . What is the area of the foyer?

- A)  $30 \text{ m}^2$       B)  $32 \text{ m}^2$   
C)  $36 \text{ m}^2$       D)  $38 \text{ m}^2$

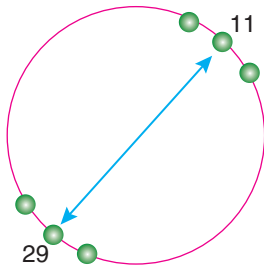
29.



There are 3 small and 5 large size cranes working in a commercial port. One small size crane has the capacity to load 8 containers per hour, and one large size crane has the capacity to load 12 containers per hour. There are 459 containers in the port that must be loaded onto the ship. All cranes started loading at the same time. After 3 hours and 30 minutes, the small size cranes malfunctioned and could no longer operate. Large size cranes loaded all the remaining containers onto the ships. How many containers have the large size cranes loaded in total?

- A) 275      B) 325  
C) 375      D) 405

30.



On the ferris wheel the 11<sup>th</sup> cabin is directly opposite the 29<sup>th</sup> cabin. How many cabins are there in total?

- A) 48      B) 36      C) 32      D) 40

31.

$a \cdot b \cdot c$	$b \cdot c$	$c$
-128	32	-4

What is  $\frac{a \cdot c}{b}$  according to the table?

- A) 2      B) 4      C) -4      D) -2

32.

$$x \cdot y = 18$$

$$x^2 \cdot y = 54$$

$$y^2 \cdot z = 72$$

What is the sum of  $x + y + z$  for integers  $x, y, z$  that satisfy the above equations?

- A) 11      B) 12      C) 13      D) 14

33.

By putting suitable signs + , - , x ,  
 $\div$  , ( , ) in-between the digits 5 5 5 5  
many numbers can be generated, for  
example,  $5 \times (5 + 5) + 5 = 55$ . Which  
of the following numbers cannot be  
generated this way?

- A) 7      B) 26      C) 70      D) 120

34.

Tim bought 37 apples and 23  
oranges from the market. He eats  
5 apples and 3 oranges every day.  
In how many days will there be the  
same number of apples and oranges  
left?

- A) 7      B) 8      C) 9      D) 10

35.

$$\frac{0.18 \cdot 0.4 - 0.04 \cdot 0.18}{0.09} = ?$$

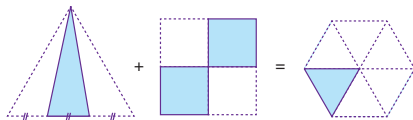
- A) 0.96                  B) 0.72  
C) 0.48                  D) 0.36

36.

Jane buys a metal sheet of 31 x 39 cm. She cuts the 4 corners off to make an open top box. The pieces cut off are 5 x 5 cm. The 4 sides are folded to make an open top box. What is the volume of the box?

- A) 2850 cm<sup>3</sup>                      B) 2945 cm<sup>3</sup>  
C) 3045 cm<sup>3</sup>                      D) 2945 cm<sup>3</sup>

37.



The total areas of the triangle and the square in the figure are equal to each other. Both of these polygons are divided into equal parts. The sum of the shaded areas in the triangle and the square is equal to the shaded area of the regular hexagon. **Accordingly, how many times is the total area of the hexagon bigger than the total area of the triangle?**

- A) 3      B)  $\frac{7}{2}$       C) 4      D) 5

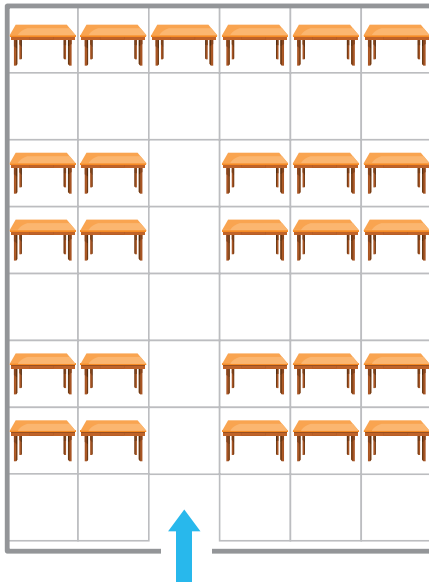
38.



Vanessa travels from Frankfurt to Budapest in her electric car. It takes 30 minutes to fully charge the battery of the vehicle and it can travel 320 km in total with a full battery. Considering that Vanessa travels at a constant speed of 120 km/h, how soon can she complete the 960 km Frankfurt-Budapest journey? (The vehicle's battery was fully charged at the start.)

- A) 8.5 hours                      B) 9 hours  
C) 10.5 hours                      D) 12 hours

39.



In a restaurant, a room is split into  $6 \times 8 = 48$  squares, to place 1 table in each square or leave a space for a corridor to the tables. The picture shows an example placement for 26 tables. What is the maximum possible number of tables that can be placed in the restaurant so that each table can be reached from a corridor?

- A) 22 people                      B) 26 people  
C) 30 people                      D) 34 people

40.

a, b, c are integers. If  $a + \frac{1}{b + \frac{1}{c}} = \frac{16}{7}$ ,

find the product of  $a \cdot b \cdot c$

- A) 6                      B) 8                      C) 12                      D) 18