2024-2025 Junior Mathematical Olympiad

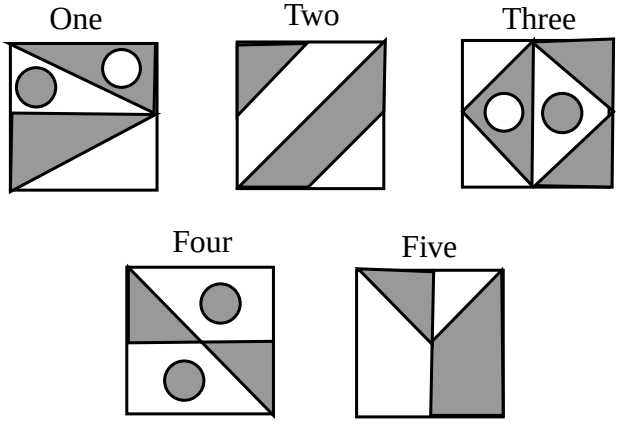
Round One Examination (Grades 5 and 6) - 10:00am

For each question, determine the letter corresponding to the correct or best response; along with the question number, indicate this letter by shading it on the answer sheet

1. What is the value of
$$\frac{1}{1+\frac{1}{3}}?$$
(A) 1/3 (B) 3/4 (C) 4/3 (D) 2/3 (E) 4/5

2. What is the value of
$$\left(\frac{2025-2024}{2}\right)^2 ?$$
(A) 1 (B) 1/2 (C) 1/4 (D) 2024 (E) 2025

3. In four of the five diagrams below, the grey area is equal to the white area.



In which diagram, are the white area and grey area different?
(A) One (B) Two (C) Three (D) Four (E) Five

4. How many \$500-bills have the same value as twenty \$50-bills plus five \$100-bills?
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

5. Students at the JMO Elementary Academy were asked

   "What is your favourite day to attend school?"

   Percentages were calculated and the results are shown in the following table:

School Day	**Percentage**
Monday	15%
Tuesday	10%
Wednesday	25%
Thursday	20%
Friday	30%

   Which day accounted for one-quarter of the preferences of students at the school?

   (A) Monday (B) Tuesday (C) Wednesday (D) Thursday (E) Friday

6. The five symbols $\bigstar, \bigcirc, \blacktriangle, \boxplus, \circledast$ repeat (in this order) to form a sequence according to the pattern:

   $$\bigstar, \bigcirc, \blacktriangle, \boxplus, \circledast, \bigstar, \bigcirc, \blacktriangle, \boxplus, \circledast, \bigstar, \bigcirc, \blacktriangle, \boxplus, \circledast, \ldots$$

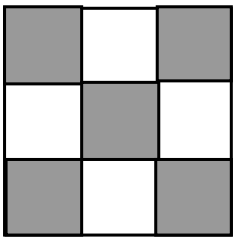
   What is the 2025th symbol in the pattern?

   (A) $\bigcirc$ (B) $\blacktriangle$ (C) $\boxplus$ (D) $\circledast$ (E) $\bigstar$

7. Two 3-digits numbers are constructed from the digits $1, 2, 3, 4, 5$ and 6, where each digit is used only once. When the two 3-digit numbers are added, what is the smallest possible sum?

   (A) 381 (B) 579 (C) 333 (D) 388 (E) 246

8. The diagram below shows a large square that is divided into 9 identical smaller squares, some of which are shaded.



   The total area of the shaded squares is 20 m^2. What is the area, in m^2, of the large square?

   (A) 4 (B) 18 (C) 24 (D) 36 (E) 72

9. What is the largest number of Mondays that can be observed in the first 52 days of a year?

   (A) 9 (B) 8 (C) 7 (D) 6 (E) 5

10. How many 4-digit whole numbers use all the digits $3, 3, 5$ and 5?

    (A) 6 (B) 5 (C) 4 (D) 3 (E) 2

11. Bill and Jill each have a glass containing 300 mL of milk. Bill pours half of his milk out and then Jill pours 20% of her milk into Bill's glass. What is the volume of milk that Bill now has in his glass?

    (A) 210 mL (B) 360 mL (C) 180 mL (D) 330 mL (E) 240 mL

12. Mom bought a year's supply of cat food for $\$48,720$. On average, how much per month did it cost Mom to buy cat food?

    (A) \$4860 (B) \$4600 (C) \$4660 (D) \$4800 (E) \$4060

13. Consider the sequence (list) of numbers where the first term is 1, the second term is 3, the third term is $1 + 3 = 4$, the fourth term is the sum of the immediately previous numbers $3 + 4 = 7$. All subsequent terms are the sums of the two numbers before them.

    $$1, 3, 4, 7, \ldots$$

    The next term that is not listed is the 5th term with value $4 + 7 = 11$. Which of the following appears in the sequence?

    (A) 76 (B) 77 (C) 78 (D) 79 (E) 80

14. In a kitchen drawer, the ratio of the number of knives to the number of spoons to the number of forks is $1 : 2 : 3$. The total number of knives, spoons and forks in the drawer **cannot** be equal to

    (A) 24 (B)15 (C) 18 (D) 30 (E) 42

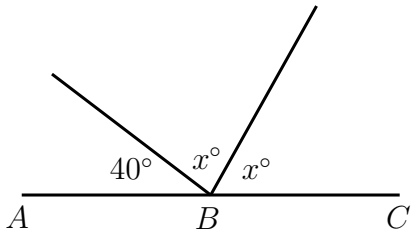
15. In the following subtraction problem, the letters a and b each represent a single digit.

    $$\begin{array}{rcc} & 8 & a \\ - & b & 6 \\ \hline & 4 & 9 \end{array}$$

    What is the value of $a + b$?

    (A) 7 (B) 8 (C) 9 (D) 10 (E) 11

16. In the diagram, B is a point on the straight line AC.



What is the value of x?

(A) 80 (B) 65 (C) 75 (D) 70 (E) 60

17. A rectangle has perimeter 120 cm. If its length is twice its width, what is the area, in cm^2, of this rectangle?

(A) 200 (B) 240 (C) 360 (D) 600 (E) 800

18. Last week Mia bought 1 school pin (her first pin). The number of pins she buy doubles each week. If Mia keeps all the pins she buys, how many pins does she have 3 weeks from now?

(A) 7 (B) 15 (C) 16 (D) 31 (E) 32

19. A tennis ball moving at a speed of 360 kilometres per hour is the same as x metres per second. What is the value of x?

(A) 120 (B) 100 (C) 80 (D) 60 (E) 50

20. Two squares are such that the perimeter of square-1 is twice the perimeter of square-2. Also, the larger square has side length of 6 (units). What is the area (in square units) of the smaller square?

(A) 2 (B) 3 (C) 6 (D) 9 (E) 12

21. Johnnie is 10 years older than what Bravo was 5 years ago. Bravo is now 15 years old. How old will Johnnie be in two years (from now)?

(A) 20 (B) 22 (C) 24 (D) 26 (E) 28

22. Grandma Gee-Gee makes 20 cookies for her grandchildren. Of the 20 cookies, 15 have raisins and 15 have nuts. What is the least number of cookies that contain both raisins and nuts?

(A) 4 (B) 5 (C) 6 (D) 8 (E) 10

23. The JMO Bookstore sells pens that come in one of three colours: red, blue, or green. Each pen carries one of four numbers: $1, 2, 3$, or 4. Byron bought n of these pens with no two pens having the same colour **and** the same number. What is the greatest (largest) possible value of n?

    (A) 7 (B) 8 (C) 11 (D) 12 (E) 13

24. Marco is writing down, in order, the counting numbers from 1 to 1000. In doing this, 5 numbers in a row, written down, add to 600. What is the *smallest* of the 5 numbers (that add to 600)?

    (A) 116 (B) 117 (C) 118 (D) 119 (E) 120

25. Planet UWI is known to have some weird looking intelligent creatures. Three such creatures, Alpha, Beta and Gamma are in a room and counted each other's eyes. Alpha saw exactly 9 eyes, Beta saw exactly 11 eyes, and Gamma saw exactly 8 eyes. No one could see their own eyes. How many eyes does Beta have?

    (A) 3 (B) 4 (C) 5 (D) 6 (E) 7