# 2022-2023 Junior Mathematical Olympiad

Final Round Examination (Grade 4)

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 $2 \times 0 \times 2 \times 3$?

   (A) 0   (B) 2   (C) 7   (D) 6   (E) 12

2. The human heart beats an average of 70 times per minute. On average how many times does it beat during one hour?

   (A) $42,000$ (B) $7,000$ (C) $4,200$ (D) 700   (E) 420

3. Mr. and Mrs. Kang have three daughters. Each of them has two brothers. How many children does this Kang family have?

   (A) 9   (B) 7   (C) 6   (D) 5   (E) 11

4. A number has the property that the square of the tens digit is equal to the triple of the sum of the hundreds and ones digits. Which of the following could this number be?

   (A) 192   (B) 741   (C) 385   (D) 138   (E) 231

5. In any order, Julie, Kassie, Zoe and Helen have their birthdays on March 1st, May 17th, July 20th and March 20th. Kassie and Zoe were born in the same month. Julie and Zoe were born on the same day of a month. Which of the girls was born on May 17th?

   (A) Julie   (B) Kassie   (C) Zoe   (D) Helen   (E) Cannot say

6. The product
$$2^2 \times 2^{2020} \times 2$$
   is equal to

   (A) 2^{4040} (B) 2^{2022} (C) 2^{4041} (D) 2^{2023} (E) 2^{8080}

7. Quadrilateral $ABCD$ is a square and its side is 10 cm long. Quadrilateral $ATMD$ is a rectangle and its shorter side is 3 cm.
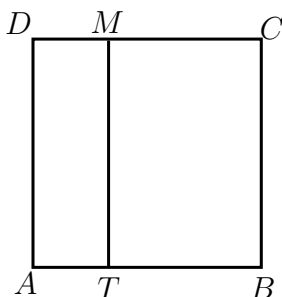

What is the difference between the sum of the lengths of all the sides of the square and the sum of the lengths of all the sides of the rectangle?

(A) 14 cm   (B) 10 cm   (C) 7 cm   (D) 6 cm   (E) 4 cm

8. There are six identical oranges on one scale of the balance and two identical melons on the other scale. After we put another melon on the scale with the oranges, the scales will be balanced.
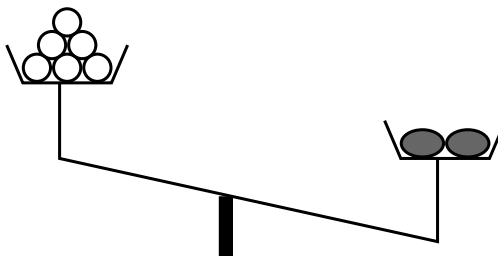
How many oranges weigh as much as one melon?

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

9. Which of the following fractions below is the greatest (largest)?

(A) $\dfrac{7}{8}$ (B) $\dfrac{66}{77}$ (C) $\dfrac{555}{666}$ (D) $\dfrac{4444}{5555}$ (E) $\dfrac{33333}{44444}$

10. Diana is 3 years old and her mother is 28 years older than her. How many years later will Diana's mother be three times older than her?

(A) 9   (B) 12   (C) 10   (D) 1   (E) 11

11. A music conductor wants to make a three-person team, consisting of a guitarist, a pianist, and a drummer. He can choose one of two guitarists, one of three pianists, and one of four drummers. If he decides to try each of the possible trios, how many attempts will he have to make?

(A) 3   (B) 9   (C) 8   (D) 12   (E) 24

12. One medal can be cut out from a golden square plate. If four medals are made from four plates, the remaining parts of those four plates can be used to make one more plate. What is the largest number of medals that could be formed when 16 plates are used?

    (A) 17   (B) 19   (C) 20   (D) 21   (E) 32

13. Twenty eight students from Grade 4 competed in a math competition. Each student earned a different number of points. The number of students who received more points than Tony is two times smaller than the number of students who had less points than Tony. In which position did Tony finish that competition?

    (A) 6th   (B) 7th   (C) 8th   (D) 9th   (E) 10th

14. An odometer in a car shows the number of kilometers travelled as 187569 km. This number consists of all different digits. After driving how many more kilometers will the odometer show a number consisting of all different digits again?

   (A) 777   (B) 12, 431   (C) 431   (D) 21   (E) 11

15.
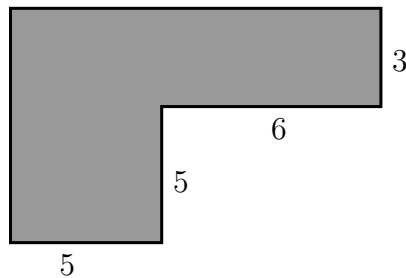
   What is the area of the shaded figure above?

    (A) 43   (B) 88   (C) 58   (D) 30   (E) 15

16. The next day after his birthday Jake said: "The day after tomorrow will be Thursday." On what day of the week did Jake have his birthday?

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

17. Peter Peters picked a peck of purple peppers. You are given that

    $$1 \text{ peck} = 1/4 \text{ bucket and } 1 \text{bucket} = 1/9 \text{ barrel.}$$

    How many more pecks of purple peppers must Peter Peters pick to fill a barrel?

    (A) 12   (B) 13   (C) 34   (D) 35   (E) 36

18. The world's largest coin has a mass of 100 kg, whereas a Jamaican $1 coin has a mass of 10 g. What sum of money in Jamaican $1 coins would weigh the same as one of the world's largest coin?

    (A) $100   (B) $1000   (C) $10 000   (D) $100 000   (E) $1 000 000

19. When the smallest three-digit number with all different digits is subtracted from the greatest three-digit number with all different digits, the result is

    (A) 864   (B) 885   (C) 800   (D) 899   (E) 888

20. Figures I, II, III and IV are squares. The perimeter of square I is equal to 16 m, and the perimeter of square II is equal to 24 m.
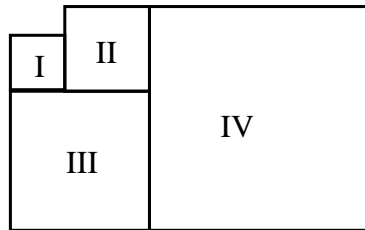

    The perimeter of square IV is equal to

    (A) 56 m   (B) 60 m   (C) 64 m   (D) 72 m   (E) 80 m

21. Ida has 14 gray balls, 8 white balls and 6 black balls in a bag. What is the least number of the balls she has to take out of her bag having her eyes closed to make sure that she took at least one ball of each color?

    (A) 23   (B) 22   (C) 21   (D) 15   (E) 9

22. Rectangle $ABCD$ is built out of 24 little squares with the length of each side equal to 1.
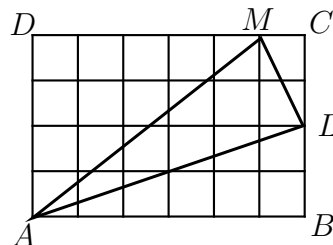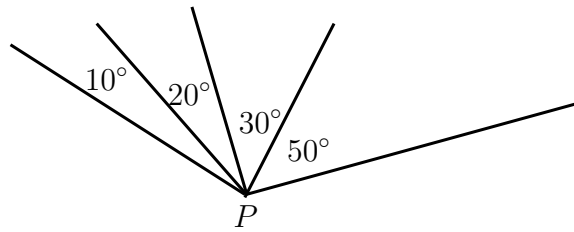

    What is the area of triangle ALM?

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

23. Four points A, B, C and D are on the number line where A and B are at 16 and 20 respectively.
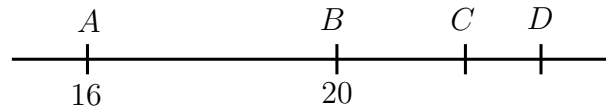
    If $AB = 2BC$ and $BC = 2CD$, what are the locations of C and D?

    (A) 24 and 32   (B) 24 and 28   (C) 24 and 26   (D) 22 and 26   (E) 22 and 23

24. A convex angle is one that is of size between $0°$ and $180°$.

How many convex angles with different measures are made by the rays with P as the starting point?

(A) 4   (B) 6   (C) 8   (D) 10   (E) 11

25. You count from 1 to 100 and you clap when you say the multiples of number 3 and the numbers that are not multiples of 3 but have 3 as the last digit. How many times will you clap your hands?

(A) 30   (B) 33   (C) 36   (D) 39   (E) 43