

# 2023-2024 Junior Mathematical Olympiad

## Qualifying Round Examination (Grades 5 and 6)

NAME\_\_\_\_\_

GRADE\_\_\_\_\_

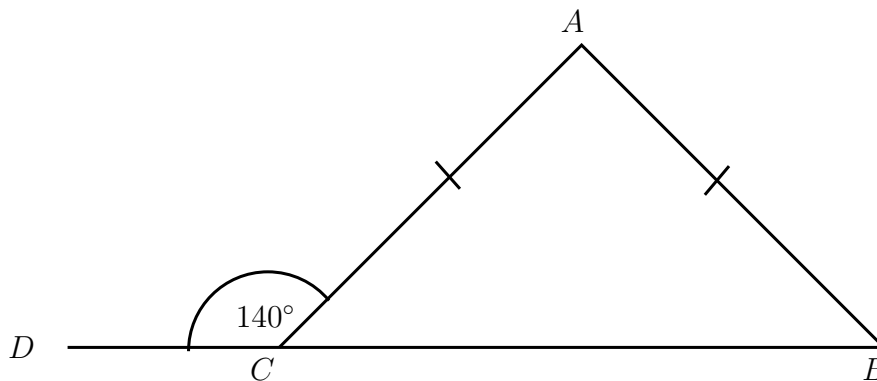
SCHOOL\_\_\_\_\_

STUDENT CONTACT NUMBER\_\_\_\_\_

- EACH entry MUST be accompanied by a nominal entry fee of **J\$1000**
- All entries must reach the Mathematics Department, U.W.I by  
**Wednesday 13 December, 2023**
- You may deliver by (a) Hand (b) Courier (c) Local Mail
- The Courier address is  
**Mathematics Department, UWI  
Mona  
Kingston 7**
- The Mailing address is  
**Junior Mathematical Olympiad  
P.O. Box 94  
Mona Post Office  
Kingston 7**

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

- Of the following, the largest sum is  $x$  and the smallest sum is  $y$   
(i)  $1110 + 9990$  (ii)  $1101 + 9909$  (iii)  $1011 + 9099$  (iv)  $1111 + 9999$   
What is the value of  $x - y$ ?  
(A) 10 (B) 90 (C) 100 (D) 110 (E) 1000
- Andre's 11th birthday was in 1999. In what year will Andre be 40 years old?  
(A) 2028 (B) 2029 (C) 2030 (D) 2039 (E) 2063
- Two days ago, Jack saved \$10 and yesterday he saved \$20. Given that on any given day Jack saved twice as many dollars as he saved the day before, in three days from now, how much in total would Jack have saved?  
(A) \$320 (B) \$550 (C) \$630 (D) \$640 (E) \$1270
- In the diagram, which is not drawn to scale,  $ABC$  is a triangle ( $\triangle ABC$ ) with  $AB = AC$  in length. The point  $D$  is such that  $DCB$  is a straight line segment and  $\angle DCA$  measures  $140^\circ$ .



What is the degree measure of  $\angle CAB$ ?

- (A)  $100^\circ$  (B)  $105^\circ$  (C)  $110^\circ$  (D)  $120^\circ$  (E)  $140^\circ$



- 
10. Last February had 28 days and each night in that month Maria had a dream. Some of her dreams involved dogs, some involved cats and some involved no animals at all. You are given that 16 involved dogs, 15 involved cats and 4 involved no animals at all. How many of Maria's dreams involved BOTH dogs and cats?
- (A) 3    (B) 5    (C) 7    (D) 9    (E) 11
11. You have \$5000 and each day you spend exactly \$60 until you can no longer do so (after day 1 you have \$4940 left). On which day, after spending, do you have exactly \$1820 left?
- (A) day 41    (B) day 45    (C) day 47    (D) day 49    (E) day 53
12. Tickets for a ride at a fair are sold as “combo” or “per ride”. The “combo” ticket which allows for entry and unlimited rides cost \$3000. A “per ride” ticket costs \$1250 to enter and \$300 per ride. For a “combo” ticket to cost less than a “per ride” ticket, a person must go on at least how many rides?
- (A) 2    (B) 3    (C) 4    (D) 5    (E) 6
13. Harry took a small pizza to the park. For his lunch, Harry ate  $\frac{1}{4}$  of the pizza. A cat came by and ate  $\frac{1}{3}$  of what Harry left behind. After that, a pigeon came and ate  $\frac{1}{3}$  of what the cat left behind. What fraction of the original pizza remained after the pigeon left?
- (A)  $\frac{1}{12}$     (B)  $\frac{1}{6}$     (C)  $\frac{1}{4}$     (D)  $\frac{1}{3}$     (E)  $\frac{5}{12}$
14. A road race starts at  $S$  and finishes at  $F$ . Between  $S$  and  $F$  there are 7 water-stations that are equally spaced out. There are also 2 rest-stops that are equally spaced out between  $S$  and  $F$ . Given that the third water-station is located 2 km after the first rest-stop, how long is the race?
- (A) 8 km    (B) 16 km    (C) 24 km    (D) 48 km    (E) 96 km

15. Abe, Ali, Tonya, and Tony participated in a six round tennis tournament. Each person played against each of the other participants exactly twice. The win-loss record for the participants are partially shown in the table below where  $W$  represents a win and  $L$  represents a loss. For example, Abe won 5 matches with a loss in the fourth round.

Player	Abe	Ali	Tonya	Tony
Result	WWWLWW	WLWLWL	LWLWLL	

What was Tony's win-loss record?

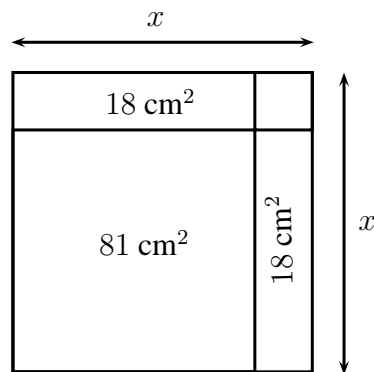
- (A)  $LLLWLW$     (B)  $LLWLLW$     (C)  $LWLLLL$     (D)  $LWLWLW$   
 (E)  $LWWLLL$
16. The symbols ♠, ■ and ★ appear in a  $20 \times 20$  (rows by columns) grid according to the pattern shown:

⋮	⋮	⋮	⋮	⋮	⋮	⋮
■	★	♠	■	★	⋮	⋮
♠	■	★	♠	■	⋮	⋮
★	♠	■	★	♠	⋮	⋮
■	★	♠	■	★	⋮	⋮
♠	■	★	♠	■	⋮	⋮

In this order (♠s, ■s, ★s), how many ♠s, ■s, and ★s appear in the completed table?

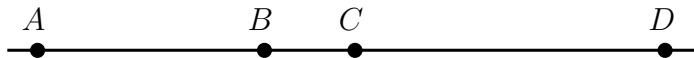
- (A) (132, 134, 134)    (B) (133, 133, 134)    (C) (133, 134, 133)  
 (D) (134, 132, 134)    (E) (134, 133, 133)
17. Grass the Hopper sits on one of a long line of grass blades. From any grass blade, Grass the Hopper can hop 5 grass blades to the right or 3 grass blades to the left. What is the least number of hops Grass the Hopper must make to reach the grass blade located 2023 grass blades to the right of where Grass the Hopper sits?
- (A) 405    (B) 407    (C) 409    (D) 411    (E) 413

18. The numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 are written on separate cards (one number per card). How many ways can the cards be divided into 3 groups of 3 cards where the sum of the numbers in the groups are all the same? **NOTE:** the group  $\{1, 2, 3\}$  is the same as the group  $\{3, 1, 2\}$ .  
 (A) 0    (B) 1    (C) 2    (D) 3    (E) 4
19. Monty and Jonas have a total of 120 coins; Bobbie and Korrie have 153; and Monty and Bobbie have 127. In total, how many coins do Jonas and Korrie have?  
 (A) 106    (B) 128    (C) 135    (D) 146    (E) 154
20. A square with sides of length  $x$  consists of a square with an area of  $81 \text{ cm}^2$ , two rectangles with areas of  $18 \text{ cm}^2$  each, and a small square.



What is the value of  $x$ ?

- (A) 2 cm    (B) 7 cm    (C) 9 cm    (D) 10 cm    (E) 11 cm
21. The points  $A, B, C$  and  $D$  are such that  $AC = 10 \text{ m}$ ,  $BD = 15 \text{ m}$  and  $AD = 22 \text{ m}$ , as shown in the figure below.



What is the length of the line segment  $BC$ ?

- (A) 1 m    (B) 2 m    (C) 3 m    (D) 4 m    (E) 5 m

22. On one side of a street, there are 177 trees, tree 1 to tree 177. One day while walking to school, Mark marked every other tree with a marker starting with tree 1. On his way home, he marked every third tree starting with tree 177. How many of the trees were not marked?  
(A) 49      (B) 59      (C) 69      (D) 79      (E) 89.
23. If we multiply all the whole numbers from 1 to 50 together to get a single number, how many zeros will be at the end of this single number?  
(A) 5      (B) 10      (C) 12      (D) 20      (E) 50.
24. For this problem, today has the date 11.25.2023 and the current time is 20 : 23 (8 : 23 P.M.). Going forward, what will be the date 2023 minutes from now?  
(A) 11.25.2023      (B) 11.26.2023      (C) 11.27.2023      (D) 12.25.2023  
(E) 12.26.2023
25. A military time watch displays time in the form  $ab : cd$  where  $ab$  is the number of hours gone in the day and  $cd$  is the corresponding minutes in the present hour. For example, when it is 1 A.M., the watch displays 01 : 00, when it is 3 : 17 P.M., the watch displays 15 : 17, when it is 12 A.M., the watch displays 24 : 00 or 00 : 00. Blossom has a habit and in a given day, for all the possible displayed times, she adds and record the sum of all the digits displayed. For example, when the watch shows 21 : 17, she adds to gets  $2 + 1 + 1 + 7 = 11$  and records 11. What is the greatest sum Blossom recorded?  
(A) 24      (B) 36      (C) 19      (D) 25      (E) 28