

THE UNIVERSITY OF THE WEST INDIES, MONA
The 2015 Jamaican Mathematical Olympiad

Test for Grades 7 and 8

NAME: _____

GRADE: _____

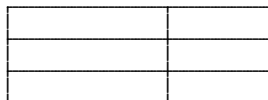
SCHOOL: _____

YEAR OF BIRTH: _____

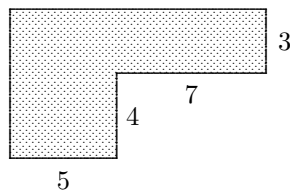
STUDENT PHONE: _____

EXAMINATION QUESTIONS

- 1) What is the value of $2014 - (2 \times 0 \times 1 \times 4)$?
- a) 2014 b) 2000 c) 2006 d) 1986 e) 8048
- 2) Rose bushes are planted in a line on one side of a path, with the bushes spaced 2 m apart. Then bushes are planted in a line on the other side of the path, also 2 m apart. If the path is 20 m long, what is the largest number of bushes that can be planted in this way?
- a) 11 b) 20 c) 12 d) 22 e) 10
- 3) How many rectangles may be found in the figure below?

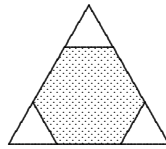


- a) 6 b) 9 c) 12 d) 15 e) 18
- 4) In how many ways can you place 2 identical \$20 dollar coins in three boxes, one red, one blue, and one green?
- a) 8 b) 6 c) 4 d) 3 e) 2
- 5) The six-sided polygon in the figure below has a right angle at each vertex. What is the area, in square units, of the shaded region?

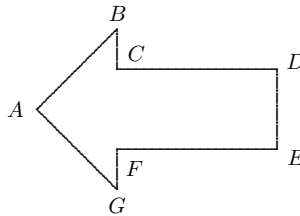


- a) 56 b) 48 c) 42 d) 41 e) 19

- 6) There were twice as many girls as boys in Miss Smith's class. After Eric left the class, there were 7 more boys than girls. After Joan left, how many girls were in the class?
- a) 6 b) 7 c) 8 d) 9 e) 10
- 7) Grandmother baked dumplings for her grandchildren. If she gives each of them 2 dumplings, she will have 3 dumplings left over. If she gives each of them 3 dumplings, she will be 2 dumplings short. How many grandchildren does Grandmother have?
- a) 2 b) 4 c) 3 d) 6 e) 5
- 8) Three identical equilateral triangles are located in the corners of a larger equilateral triangle. Each side of the larger triangle measures 6 cm. When the perimeters of the smaller triangles are added, their sum is equal to the perimeter of the shaded hexagon. What is the length of one side of a smaller triangle?



- a) 1 cm b) 1.5 cm c) 1.25 cm d) 2 cm e) 1.2 cm
- 9) A digital clock displays the time in 24-hour format using two digits for each hour and two for each minute. Between one minute after midnight (00:01) and one minute before the next midnight (23:59), how many times will the clock show a time that reads the same from the left as from the right (for example, 15:51)?
- a) 8 b) 12 c) 14 d) 15 e) 24
- 10) Stephen and Andrew were running around the track at constant speeds. Stephen ran 5 laps every 12 minutes, and Andrew ran 3 laps every 10 minutes. Both boys started together, and they finished running the first time they were together again at the starting line. How many laps did the two boys run all together?
- a) 3 b) 86 c) 43 d) 135 e) 90
- 11) The arrow-shaped polygon in the figure below has right angles at A , C , D , E , and F . The segments BA and AG have equal length, $BC = FG = 5$, $CD = EF = 20$, and $DE = 10$. What is the area of this polygon?



- a) 300 b) $250 + 20\sqrt{2}$ c) 350 d) $250 + 10\sqrt{2}$ e) 250
- 12) When 999 is divided by a certain two-digit number n , the remainder is equal to 3. What will the remainder be when 2001 is divided by n ?
- a) 1 b) 3 c) 6 d) 7 e) 9

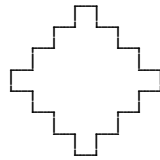
- 13) When a carton of juice is three-fourths full, it has enough juice to fill one and one-half glasses. How many glasses will the juice from 5 new cartons fill?

a) $7\frac{1}{2}$ b) $3\frac{3}{4}$ c) 10 d) 8 e) $8\frac{1}{4}$

- 14) When Carl the Camel is thirsty, water makes up 84% of his body weight. After he drinks, Carl weighs 800 kg and water makes up 85% of his weight. How much does Carl the Camel weigh when he is thirsty?

a) 672 kg b) 680 kg c) 715 kg d) 720 kg e) 750 kg

- 15) In the polygon below, each side is perpendicular to the sides adjacent to it and all sides in the figure are congruent. The perimeter of the polygon is 56 cm. What is its area?



a) 84 cm^2 b) 96 cm^2 c) 100 cm^2 d) 112 cm^2 e) 196 cm^2

- 16) A certain broken calculator does not display the digit 7. For example, if we type in the number 3747, only the number 34 is displayed, with no spaces. Mike typed a six-digit number on this calculator, but only 2014 appeared on the display. How many different numbers could Mike have typed?

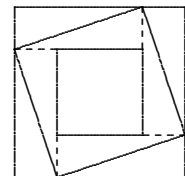
a) 12 b) 13 c) 14 d) 15 e) 16

- 17) Carlos adds five numbers together. None of them is greater than 20. The numbers may be repeated. From the sum he subtracts the smallest number (or one of them if more than one number has the smallest value), and writes the difference as the final result. If the sum of the five numbers is 72, what is the smallest final result he could obtain?

a) 58 b) 72 c) 57 d) 52 e) 54

- 18) The area of the biggest square shown on the right is 16 cm^2 and the area of the smallest square is 4 cm^2 . What is the area of the square which is between them?

a) 8 cm^2 b) $8\frac{1}{2}\text{ cm}^2$ c) 10 cm^2 d) $10\frac{1}{2}\text{ cm}^2$
e) 12 cm^2



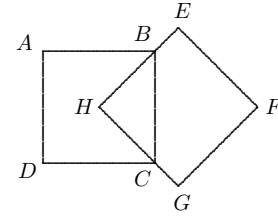
- 19) The ones digit of a certain three-digit number is 2. If we move this digit to the beginning of the number, we get a three digit number that is smaller than the original by 36. What is the sum of the digits of this number?

a) 1 b) 5 c) 9 d) 7 e) 10

- 20) Mr. Williams said, "The product of my children's ages is equal to 1664. My oldest child is twice as old as my youngest." How many children does Mr. Williams have?

a) 2 b) 3 c) 4 d) 5 e) 6

- 21) In the figure on the right, $ABCD$ and $EFGH$ are identical squares with side length 10. The vertex H of square $EFGH$ is the centre of $ABCD$. Sides HE and HG pass through B and C , respectively. What is the area of polygon $ABEFGCD$?



- a) 75 b) 100 c) 125 d) 150
e) 175

- 22) A certain boy always tells the truth on Thursdays and Fridays, always lies on Tuesdays, and randomly tells the truth or lies on the other days. On seven consecutive days he was asked what his name was. On the first six days he said, in this order, John, Bob, John, Bob, Peter, and Bob. What answer did he give on the seventh day?

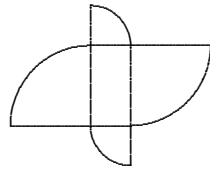
- a) John b) Bob c) Peter d) Kate e) some other name

- 23) A 3×3 table contains positive integers (see the figure on the right). Nick and Pete crossed out four numbers each. They noticed that the sum of the four numbers Pete crossed out was exactly 3 times the value of the sum of the four numbers Nick crossed out. Which number was the only one that neither Pete nor Nick had crossed out?

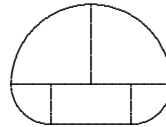
4	12	8
13	24	14
7	5	23

- a) 4 b) 7 c) 14 d) 23
e) 24

- 24) Emily arranged five cardboard pieces into the shape of a bird (see the figure below). One piece was a rectangle measuring 5 cm by 10 cm, two pieces were quarters of a large circle, and two were quarters of a small circle. Benjamin moved the pieces around and made the shape of an egg. How much larger is the perimeter of the bird than the perimeter of the egg?



Emily's Bird



Benjamin's Egg

- a) 2.5 cm b) 5 cm c) 10 cm d) 20 cm e) 30 cm

- 25) Peter rides a bicycle from town P to town Q at a constant speed. If he increases his speed by 3 k/h he will arrive at town Q 3 times faster. How many times faster will he arrive if he increases his speed by 6 k/h?

- a) 4 b) 5 c) 6 d) 4.5 e) 8

END OF QUESTIONS

You may mail your completed question paper to:

Mathematical Olympiad
P.O. Box 94
Mona Post Office
Kingston 7

You may also deliver your entry by hand or by courier directly to the Department of Mathematics at the UWI, Mona Campus. In all cases, an entry must be received by December 1, 2014 in order to be considered.