The University of the West Indies, Mona Campus

The 2014 Jamaican Mathematical Olympiad

First Round

Test for Grades 7 and 8

Part A

This part consists of four multiple-choice questions. For each one, mark the letter for the correct answer $\big($(a), (b), (c), (d), or (e)$\big)$ in the answer book provided. Each question in this part is worth 5 marks.

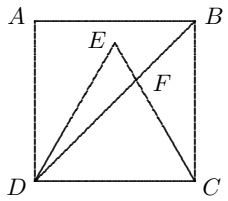
1) The value of $2.6 + 0.12$ is:

(a) 3.8 (b) 2.7 (c) 2.02 (d) 2.0 (e) 2.72

2) Ava had a bag of sweeties. She gave half of them to Beth, Beth gave one-third of her share to Celine, and Celine gave one-fourth of her share to Davia. Davia received 3 sweeties from Celine. How many sweeties did Ava have in her bag?

(a) 72 (b) 64 (c) 108 (d) 84 (e) 12

3) In the figure below, $ABCD$ is a square and DEC is an equilateral triangle. The lines DB and EC intersect at F. What is the measure of $\angle BFC$?



(a) 95° (b) 105° (c) 115° (d) 125° (e) 135°

4) In a certain room there are stools and chairs. On each stool and on each chair there is a child. Each stool has 3 legs, each chair has 4 legs, and each child has 2 legs. Altogether, there are 39 legs. How many chairs are in the room?

(a) 3 (b) 4 (c) 5 (d) 6 (e) 9

Part B

This part consists of eight written-answer questions. For each one, give your solution in the answer book provided. Each question in this part is worth 10 marks. To score full marks, you must provide an answer which is both correct and completely justified.

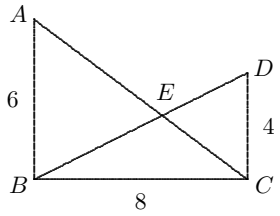
5) Anna is 10 years old and her mother is 4 times as old as Anna. How old will her mother be when Anna is twice as old as she is now?

6) Edward wrote down all the numbers from 1 to 100, inclusive. How many times did he write the digit 7?

7) A solid box is 15 cm by 10 cm by 8 cm. A new solid is formed by removing a cube 3 cm on a side from each corner of this box. What percent of the original volume is removed?

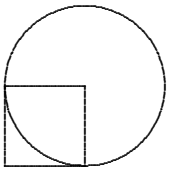
8) The sum of two numbers is S. Suppose 3 is added to each number and then each of the resulting numbers is doubled. What is the sum of the final two numbers?

9) In the figure below, $\angle ABC$ and $\angle BCD$ are right angles, $AB = 6$, $BC = 8$, and $CD = 4$. What is the difference between the areas of $\triangle ABE$ and $\triangle EDC$?



10) Mario has 7 pigs on his farm. One day, he weighed them. He noticed that each pig was 5 kg heavier than the one he weighed before it. If the sum of their weights is 1001 kg, how much did the heaviest pig weigh?

11) The figure below shows a circle and a square. The centre of the circle is at one vertex of the square and the circle passes through two other vertices. Each side of the square measures 10 cm. What is the area of the union of the regions enclosed by the circle and the square?



12) A positive integer is called *marvelous* if the product of its digits is 24. How many three-digit numbers are marvelous?