

The 2010 Jamaican Mathematical Olympiad

Presented by

The University of the West Indies

in Collaboration with

Sterling Asset Management Ltd.

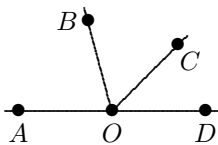
FIRST ROUND EXAMINATION

TEST FOR GRADES 9, 10 AND 11

Part A

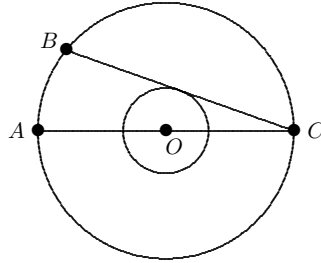
This part consists of 7 multiple-choice questions. For each one, write the letter for the correct answer ((a), (b), (c), (d), or (e)) in the answer book provided. Each question in this part is worth 5 marks.

- 1) What is 30% of 40% of 400?
(a) 280 (b) 120 (c) 19,200 (d) 48 (e) 160
- 2) Yesterday, Mrs. Brown went to town. After she spent one-third of her money on groceries, she deposited \$1,000 in her bank account. If she had \$200 remaining, how much money did she start with?
(a) \$1,800 (b) \$2,600 (c) \$3,200 (d) \$1,500 (e) \$3,600
- 3) In the diagram below, $\angle BOC = 60^\circ$ and $\angle COD$ is two-thirds of $\angle BOA$. What is the measure of $\angle COD$?



- (a) 45° (b) 22.5° (c) 48° (d) 40° (e) 30°
- 4) In November, a woman told her friend that her son was 100 months old. In which month was her son born?
(a) March (b) July (c) February (d) November (e) September
- 5) Shannon picked 17 clovers this morning. If all of them had three or four leaves and she had a total of 63 leaves, how many four-leaf clovers did she pick?
(a) 1 (b) 17 (c) 63 (d) 5 (e) 12

- 6) In the diagram below, both circles have centre O and their radii are in the ratio of $3 : 1$. Also, AC is a diameter of the larger circle and BC is tangent to the smaller circle. If AB is 12, what is the radius of the larger circle?

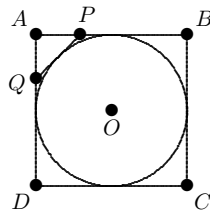


- (a) 12 (b) 24 (c) 6 (d) 18 (e) 30
- 7) Suppose a girl tells only lies on Monday, Tuesday, and Wednesday, and tells only the truth on the other days of the week. On how many days of the week can she say, “I am lying today and I will tell the truth tomorrow”?
- (a) 2 (b) 1 (c) 7 (d) 0 (e) 3

Part B

This part consists of three written-answer questions. For each one, give a complete solution in the answer book provided. Each question in this part is worth 10 marks.

- 8) Find the smallest natural number N with the properties that when N is divided by 7 its remainder is 4, and when N is divided by 12 its remainder is 5.
- 9) Suppose a square $ABCD$ is circumscribed about a circle with centre O and radius 1. Let P and Q be the points such that $AP = AQ$ and PQ is tangent to the circle. Find the length of the segment OP .



- 10) How many natural numbers N have the property that $N^2 - 72$ is a perfect square?