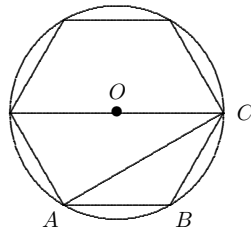


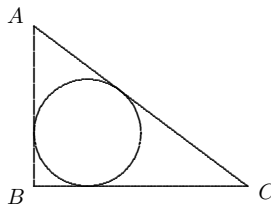
The 2015 Jamaican Mathematical Olympiad

Pracice Problem Set 5

- 1) How many 3-digit numbers abc have the property that $a + 3b + c$ is a multiple of 3?
- 2) Let $x_1, x_2,$ and x_3 be numbers such that $\frac{1}{4} < x_1 < x_2 < x_3 < \frac{1}{3}$. Suppose the distances between the consecutive numbers $1/4, x_1, x_2, x_3,$ and $1/3$ are all equal. What is x_1 ?
- 3) In the figure below, a regular hexagon is inscribed in a circle of radius 1. What is the area of triangle ABC ?



- 4) The natural numbers 24, 36, and N have the property that the product of any two of them is a multiple of the third number. What is the smallest possible value for N ?
- 5) A two-digit number is called *fascinating* if the number obtained by reversing its digits is 75% larger than the original number. For example, 24 is fascinating because 42 is 75% larger than 24. How many two-digit numbers are fascinating?
- 6) We say that a 3-digit number is *balanced* to mean that its middle digit (*i.e.*, its tens digit) is the average of its other two digits. How many 3-digit numbers are balanced?
- 7) The triangle ABC below has a right angle at B . If $AB = 3, BC = 4,$ and $CA = 5,$ what is the radius of the inscribed circle?



- 8) If $x = \frac{1}{\sqrt{1} + \sqrt{2}} + \frac{1}{\sqrt{2} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{4}} + \dots + \frac{1}{\sqrt{99} + \sqrt{100}}$, what is the value of x ?