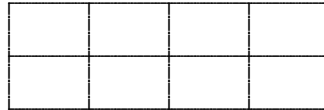


The 2015 Jamaican Mathematical Olympiad

Practice Problems Set 1

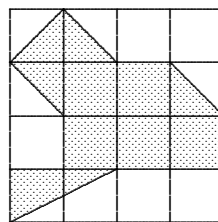
- 1) Nickiesha ate one sweetie one day, and each day afterward she ate one sweetie more than he did the day before. How many sweeties did she eat during her first week?
- 2) How many rectangles may be found in the figure below?



- 3) Anna bought a pizza. She gave two-thirds of it to her sister and one-half of the remaining part to her mother. She ate the rest. What portion of the pizza did Anna eat?
- 4) The pattern below repeats every six symbols. What are the 100th and 101st symbols (in this order) in the pattern?

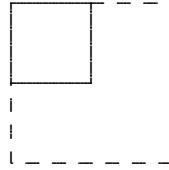


- 5) Which number is half way between 2006 and 6002?
- 6) In the figure below, each small square has area 1 cm^2 . What is the area, in square centimetres, of the shaded region?

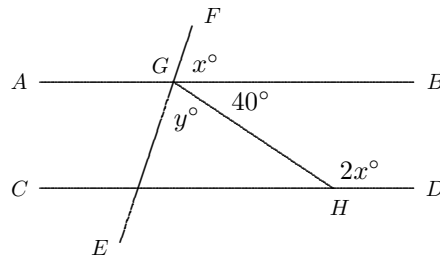


- 7) A certain lock uses three numbers, each with one digit, for a combination. For example, 9-1-0 and 4-5-5 could be combinations. How many combinations are possible that use three different odd digits?
- 8) Suppose you count from 1 to 100 and clap your hands when you count either a multiple of 3 or a number which is not a multiple of 3 but ends in 3. How many times will you clap your hands?
- 9) Shania subtracted the smallest three-digit number with all different digits from the largest three-digit number with all different digits. What was the result?
- 10) All together, 6 chicks eat 8 cups of grain in 3 days. How many cups of grain will 3 chicks eat in 9 days?

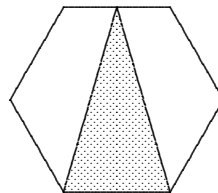
- 11) Olympiette is a small country with exactly seven towns. No three towns lie on the same straight line. Each pair of towns is connected by one and only one straight road. Determine the number of straight roads that connect the seven towns.
- 12) Akeem's uncle needs 12 minutes to walk around a square plaza. How many minutes will he need to walk at the same pace around a plaza that has an area four times greater?



- 13) How many four-digit numbers $abcd$ are multiples of 3, 4, and 5 and satisfy the conditions that a is twice as much as c , and b is equal to 6?
- 14) An odd whole number between 600 and 800 is divisible by 7 and by 9. What is the sum of its digits?
- 15) In the figure below AB is parallel to CD , and EF meets AB at G . What is the value of y ?



- 16) The sum of the ages of Abigail and Brianna is 25. The sum of the ages of Abigail and Christina is 20. The sum of the ages of Brianna and Christina is 31. Which of these three people is the oldest and what is her age?
- 17) In the figure below, a triangle is inscribed in a regular hexagon. What proportion of the area of the hexagon is shaded?



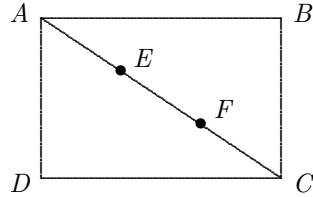
- 18) If $4^x = 9$ and $9^y = 256$, what is the value of xy ?
- 19) What is the sum of the digits of the square of 111,111,111?

20) Suppose M is 30% of Q , Q is 20% of P , and N is 50% of P . What is the value of M/N ?

- a) $\frac{3}{250}$ b) 1 c) $\frac{6}{5}$ d) $\frac{3}{25}$ e) $\frac{4}{3}$

21) Emily plants 60 tulip bulbs. When they flower, she notices that half are yellow, one third of those that are not yellow are red, one quarter of those that are neither yellow nor red are pink. The remainder are white. What fraction of the tulips are white?

22) In the figure below, $ABCD$ is a rectangle with $AB = 5$ and $AD = 3$. The points E and F divide AC into three equal parts. What is the area of triangle BEF ?

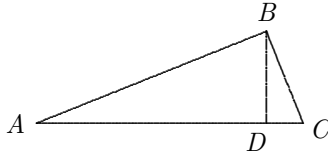


23) The positive real numbers a , b , c , d , and e satisfy the conditions $ab = 2$, $bc = 3$, $cd = 4$, and $de = 5$. What is e/a ?

24) Suppose a and b are positive real numbers greater than 1. Which of the following fractions has the greatest value?

- (a) $\frac{a}{b-1}$ (b) $\frac{a}{b+1}$ (c) $\frac{2a}{2b+1}$ (d) $\frac{2a}{2b-1}$ (e) $\frac{3a}{3b+1}$

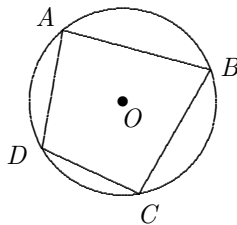
25) In the figure below, ABC is a right triangle with a right angle at B , and BD is an altitude. (So, $\angle BDA$ is also a right angle.) If $AD = 64$ and $AC = 100$, what is AB ?



26) What is the maximum number of digits a number can have if every pair of consecutive digits is a perfect square?

27) The average age of a group of doctors and lawyers is 40. If the doctors average 35 and the lawyers 50 years old, what is the ratio of the number of doctors to the number of lawyers?

28) In the figure below, the quadrilateral $ABCD$ is inscribed in a circle with center O . Suppose $\angle OAB = 35^\circ$, $\angle OBC = 40^\circ$, and $\angle OCD = 55^\circ$. What is $\angle ODA$?



- 29) The ages of Juan and his sister add up to half their father's age. If Juan is 3 years older than his sister and 27 years younger than his father, how many years old is Juan?
- 30) In how many ways can the numbers 1, 2, 3, 4, 5 and 6 be written in the squares in the figure below so that no numbers in adjacent squares differ by 3? (Squares that share only a corner are not considered adjacent.)

