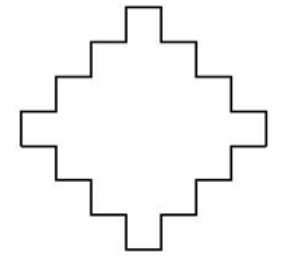
**FMA Team Mathematics Competition - Zone**

**YEAR 13 – 2017**

Y13/1 What is 0.5555... [recurring] + 0.6666... [recurring] as a fraction in its simplest form?

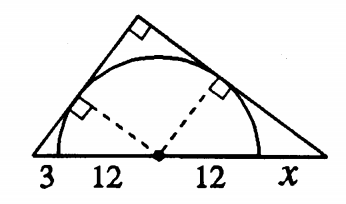
Y13/2 The sum of two positive numbers is 16. Find the smallest possible value of the sum of their squares.



Y13/3 All 28 sides of the polygon are equal in length with adjacent sides perpendicular. If the perimeter of the polygon is 56 cm, what is the area of the polygon?

Y13/4 A rectangular block with dimensions has its surface painted red, and is then cut into cubes with edge length 1 cm. The number of cubes having exactly one of its faces painted red is

Y13/5 97 is a prime number. When its digits are reversed, the new number is also prime, i.e. 97 and 79 are both prime. How many two-digit prime numbers, less than 50, have this property?



Y13/6 A semicircle is tangent to both legs of a right triangle and has its center on the hypotenuse. The hypotenuse is partitioned into 4 segments, with lengths 3, 12, 12, and x, as shown. What is the value of x?

Y13/7 If and , compute

Y13/8 What are all 3 ordered triples of integers with, for which ?

Y13/9 What is the largest prime divisor of every 3-digit number with 3 identical non-zero digits?

Y13/10 If then is satisfied by only one pair of positive integers (a,b). What is the value of a+b?

Y13/11 This coming Halloween, Tom plans to scare twice as many people as Sam, and Sam plans to scare three times as many people as Roz. In all, they plan to scare at most 2005 people. If no one is scared more than once, at most how many people does Sam plan to scare?

Y13/12 A distribution consists of the integers from 1 through 100, inclusive, such that the frequency of each integer n is . What is the median of this distribution?

Y13/13 The cost of 3 hamburgers, 5 milk shakes, and 1 order of fries at a certain fast food restaurant is $23.50. At the same restaurant, the cost of 5 hamburgers, 9 milk shakes, and 1 order of fries is $39.50. What is the cost of 2 hamburgers, 2 milk shakes ,and 2 orders of fries at this restaurant?

Y13/14 Find the minimum of over all real numbers x.

Y13/15 How many pairs of positive integers (a, b) with , satisfy ?

Y13/16 

Y13/17 The number of fish that swam with me is the sum of the digits of the largest integer x which satisfies. How many fish swam with me?

Y13/18 When 97 is written as the difference between the squares of two positive consecutive integers, both being less than 100, then what is the value of the smaller integer?

Y13/19 Last year, at the school where Gill teaches Mathematics, 315 out of the 600 pupils were girls. This year, the number of pupils in the school has increased to 640. The proportion of girls is the same as it was last year. How many girls are there at the school this year?

Y13/20 How many diagonals does a regular undecagon (11-sided polygon) have?

TIE BREAKER

Y13/21 Find all ordered pairs such that

Y13/22 I add up all even numbers between 1 and 101. Then from my total I subtract all odd numbers between 0 and 100. What is the result?