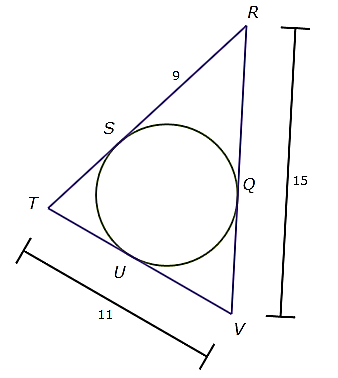
**FMA-TMC-Finals**

**YEAR 11– 2014**

Y11/1 What is the quadratic function with zeros 9 and -4.

Y11/2 The equation of line is . Line includes the point and is perpendicular to line . What is the equation of line

Y11/3 What is the size of ? and are points on the triangle where the circumference of the circle touches.



Y11/4 The sum of two consecutive odd numbers is 20 and their difference is 2. Find the two numbers.

Y11/5 Two jets are flying towards each other from airports that are 1200 km apart. One jet is flying at 250 km/h and the other jet at 350 km/h. If they took off at the same time, how long will it take for the jets to pass each other?

Y11/6 The diagonal of a rectangle is 25 cm more than its width. The length of the rectangle is 17 cm more than its width. What is the lenght of the diagonal?

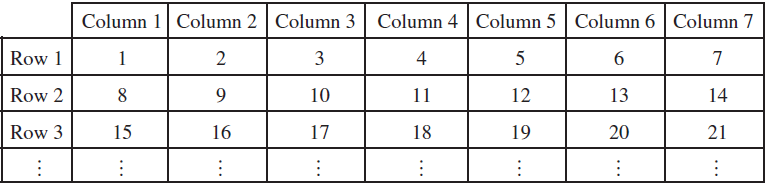
Y11/7 If 4 times a number is increased by 6, the result is 15 less than the square of the number. Find the number.

Y11/8 Tshamano is now five times as old as his son Murunwa. Seven years from now, Tshamano will be three times as old as his son. What is the age of Murunwa.

Y11/9 If for all values of , then what is the value of ?

Y11/10 Given , how many of the numbers between 3 and 89 cannot be writtern as the sum of two elements of the set?

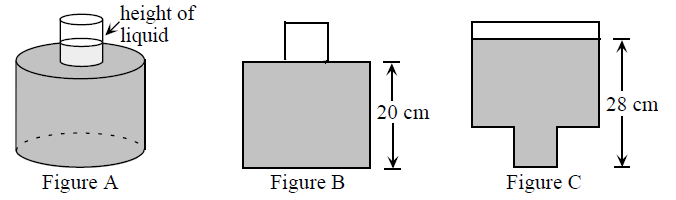
Y11/11 The natural numbers from 1 to 2100 are entered sequentially in 7 columns, with the first 3 rows as shown. The number 2002 occurs in column and row . What is the value of ?



Y11/12 A bag contains 20 candies: 4 chocolate, 6 mint and 10 butterscotch. Candies are removed randomly from the bag and eaten. What is the minimum number of candies that must be removed to be *certain* that at least two candies of each flavour have been eaten?

Y11/13 Xavier, Yolanda, and Zixuan have a total of . The ratio of the amount Xavier has to the total amount Yolanda and Zixuan have is . Yolanda has $4 more than Zixuan. How much does Zixuan have?

Y11/14 A sealed bottle, which contains water, has been constructed by attaching a cylinder of radius 1 cm to a cylinder of radius 3 cm, as shown in Figure A. When the bottle is right side up, the height of the water inside is 20 cm, as shown in the cross-section of the bottle in Figure B. When the bottle is upside down, the height of the liquid is 28 cm, as shown in Figure C. What is the total height, in cm, of the bottle?



Y11/15 Oranges are placed in a pyramid-like stack with each layer completely filled. The base is a rectangle that is 5 oranges wide and 7 oranges long. Each orange, above the first layer, rests in a pocket formed by four oranges in the layer below, as shown. The last layer is a single row of oranges. What is the total number of oranges in the stack?



Y11/16 There are 30 people in a room, 60% of whom are men. If no men enter or leave the room, how many women must enter the room so that 40% of the total number of people in the room are men?

Y11/17 On seven tests, each out of 100 marks, Siobhan received marks of , and . If her average mark on the seven tests is 66, then what is the minimum possible value of ?

Y11/18 Ivan trained for a cross-country meet.

On Monday, he ran a certain distance.

On Tuesday, he ran twice as far as he ran on Monday.

On Wednesday, he ran half as far as he ran on Tuesday.

On Thursday, he ran half as far as he ran on Wednesday.

On Friday, he ran twice as far as he ran on Thursday.

If the shortest distance that he ran on any of the five days is 5 km, how far did he run in total?

Y11/19 If and , what is the value of ?

Y11/20 A deck of 100 cards is numbered from 1 to 100. Each card has the same number printed on both sides. One side of each card is red and the other side is yellow. Barsby places all the cards, red side up, on a table. He first turns over every card that has a number divisible by 2. He then examines all the cards, and turns over every card that has a number divisible by 3. How many cards have the red side up when Barsby is finished?

Tie Breaker

Y11/21 In a factory, Erika assembles 3 calculators in the same amount of time that Nick assembles 2 calculators. Also, Nick assembles 1 calculator in the same amount of time that Sam assembles 3 calculators. How many calculators in total can be assembled by Nick, Erika and Sam in the same amount of time as Erika assembles 9 calculators?

Y11/22 A two-digit positive integer has the property that when 109 is divided by , the remainder is 4. What is the sum of all such two-digit positive integers ?