**FMA Team Mathematics Competition - Zone**

**YEAR 10 – 2016**

Y11/1 "**Pythagorean triples**" are integer solutions to the **Pythagorean** Theorem, a2 + b2 = c2. If is a Pythagorean triple, apart from 0, what is the value of ?

Y11/2 Solve for the value(s) of x from the given equation:



Y11/3 Evaluate the following:



Y11/4 If 6 and has the same mean as the set {2, 4, 24}, what is the value of *x*?

Y11/5 What is the value of n such that is a perfect square?

Y11/6 Find the sum of the factors of 1225.

Y11/7 Two trains are approaching each other on a long straight section of track. One train is going 5 kilometres per hour and the other is going 3 kilometres per hour. At the time when the trains are 3 kilometres apart a mosquito starts flying from the front of the slower train towards the faster train. When it reaches the faster train it immediately turns around and flies back towards the slower train. If the trains are one kilometre apart when the mosquito first returns to the slower train, what is the speed at which the mosquito is flying, measured in kilometres per hour?

Y11/8 The average of three numbers is 27. If the largest number is replaced by the number 89 then the average of the three numbers is 40. What is the original number that is replaced?

Y11/9 A kitchen is 10 long and 8 wide. If the kitchen floor tiles are by , how many tiles are needed for the kitchen? .

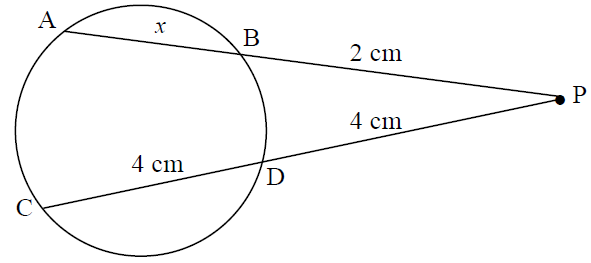
Y11/10 A square whose area is equal to the perimeter of the rectangle, whose value is 16, is inscribed in a circle with its four vertices on the circumference of the circle. What is the exact diameter of the circle?

Y11/11 What is the value of in the equation 2 over minus 3 equals 26 over

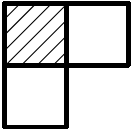
Y11/12 If and are two distinct numbers with then what is the value of?

Y11/13 The regular price for a bicycle is $320. The bicycle is on sale for 20% off. The regular price for a helmet is $80. The helmet is on sale for 10% off. If Sandra bought both items on sale, what is her percentage savings on the total purchase?

Y11/14 The figure given below shows two chords intersecting at point P. what is the length of chord AP?



Y11/15 Rebecca is holding a seminar at the place at which she works. She wants to create an unbroken ring of tables, using a set of identical tables shaped like regular polygons (every side has the same length – such as a square, with four equal sides), Each table must have two sides which completely intersect with the sides of other tables, such as the hatched square table seen below. Rebecca plans to put items on display inside the ring where everyone can see them. Rebecca first decides to use identical square tables. What is the minimum number of square tables placed beside each other so that there is an empty space in the middle?



Y11/16 There were 60 birds on three trees. At some moment 6 birds flew away from the first tree, 8 birds flew away from the second tree, and 4 birds flew away from the third tree. After that, it turned out that the number of birds on each tree was the same. How many birds were there on the second tree in the beginning?

Y11/17 A bin contains 10 kg of peanuts. 2 kg of peanuts are removed and 2 kg of raisins are added and thoroughly mixed in. Then 2 kg of this mixture are removed and 2 kg of raisins are added and thoroughly mixed in again. What is the ratio of the mass of peanuts to the mass of raisins in the final mixture?

Y11/18 Anna and Tima alternate turns tossing a fair coin. Anna goes first and each player takes three turns. The first player to toss a tail wins. If neither Anna nor Tima tosses a tail, then neither wins. What is the probability that Anna wins?

Y11/19 There are two values of for which the equation has two equal real roots. What is the sum of these vales of ?

Y11/20 There are 2 girls and 6 boys playing a game. How many additional girls must join the game so that of the players are girls?

TIE BREAKER

Y11/21 If and what can we logically say about c and f?

Y11/22 What is the least positive number divisible by 7, 6 and 12.