**FMA-TMC-Finals**

**YEAR 12– 2014**

F6/1 Find the perpendicular bisector of the line segment with endpoints at and.

F6/2 What is the radius of the circle having the equation.



F6/3 The Zoo has a number of two-legged birds and a number of four-legged mammals. On one visit to the Zoo, Margie counted 200 heads and 522 legs. How many of the animals that Margie counted were two-legged birds?

F6/4 Zoe was born on her mother's 24th birthday so they share birthdays. Assuming they both live long lives, on how many birthdays will Zoe's age be a factor of her mother's age?

F6/5 Rachel and Nicky stand at either end of a straight track. They then run at constant (but different) speeds to the other end of the track, turn and run back to their original end at the same speed they ran before. On their first leg, they pass each other 20 m from one end of the track. When they are both on their return leg, they pass each other for a second time 10 m from the other end of the track. How many metres long is the track?

F6/6 The sum of five consecutive integers is equal to the sum of the next three consecutive integers. What is the largest of these eight integers?

F6/7 Elections in Herbville were held recently. Everyone who voted for the Broccoli Party had already eaten broccoli. Of those who voted for other parties, 90% had never eaten broccoli. Of those who voted, 46% had eaten broccoli. What percentage voted for the Broccoli Party?

F6/8 What is the value of?

F6/9 Last year there were 30 more boys than girls in the school choir. This year the number of choir members has increased by 10%, the number of girls has increased by 20% and the number of boys by 5%. How many members does the choir have this year?

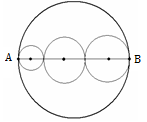
F6/10 In an arithmetic sequence, the sum of the first and third terms is 6 and the sum of the second and fourth terms is 20. Determine the tenth term in the sequence.

F6/11 Determine the value of for which**.**

F6/12 Sergio recently opened a store. One day, he determined that the average number of items sold per employee to date was 75. The next day, one employee sold 6 items, one employee sold 5 items, and one employee sold 4 items. The remaining employees each sold 3 items. This made the new average number of items sold per employee to date equal to 78.3. How many employees are there at the store?

F6/13 If ⊗ is a new operation defined as, what is the value of?

F6/14 Three circles tangent to each other and to a larger circle, have their centers on the diameter AB of the larger circle. The larger circle has a radius of, what is the sum of the perimeters of the three small circles.



F6/15 How many liters of 20% alcohol solution should be added to 40 liters of a 50% alcohol solution to make a 30% solution?

F6/16 A swimming pool can be filled by pipe A in 3 hours and by pipe B in 6 hours, each pump working on its own. At 9 am pump A is started. At what time will the swimming pool be filled if pump B is started at 10 am?

F6/17 Find so that the curve has one horizontal tangent line only.

F6/18 is a third quarter angle such that and is a second quarter angle such that Find exact value of. (Give answer in the simplest form)

F6/19 A student can select one of 6 different mathematics books, one of 3 different chemistry books and one of 4 different science books. In how many different ways can a student select a book of mathematics, a book of chemistry and a book of science?

F6/20 Students in a music history class are giving presentations on 5 different periods. In how many orders could periods be presented?

Tie Breaker

F6/21 If, what is the value of ?

F6/22 On Saturday, Jimmy started painting his toy helicopter between 9:00 a.m. and 10:00 a.m. When he finished between 10:00 a.m. and 11:00 a.m. on the same morning, the hour hand was exactly where the minute hand had been when he started, and the minute hand was exactly where the hour hand had been when he started. How many hours did Jimmy spent on painting his toy helicopter.