**FMA-TMC-Finals**

**YEAR 13 - 2014**

Y13/1 Determine the value of

Y13/2 One out of every three seats on an airplane is empty. There are 72 passengers on the plane. How many empty seats are there?

Y13/3 The square root of half Josephine’s age in years is half the sum of the first 3 prime numbers. What is Josephine’s age in years?

Y13/4 What is the total number of digits it takes to number the pages of a book from 1 to 300 (inclusive)?

Y13/5 In a certain village there are 800 women. 3% wear one earring. Of the other 97%, half wear two ear rings, the other half wear none. How many earrings are worn altogether?

Y13/6 There are 3 light switches turned off. Every minute a person comes by and randomly flips exactly one of the switches. On average, how many minutes will pass before all three lights first get turned on at the same time?

Y13/7 City P is 625 kilometers from City Q. M departed from City P at 5:30 a.m. travelling at 100 kilometers per hour, and arrived at City Q. Fifteen minutes after M left, N departed from City Q and arrived at City P travelling at 80 kilometers per hour. At what time did M and N meet together?

Y13/8 A rectangle is inscribed in a square so that each of the four triangles formed is isosceles. Determine the length of the diagonal of the rectangle if the sum of the areas of these four triangles is 200 cm2.



Y13/9 An office building has 50 storeys, 25 of which are painted black and the other 25 of which are painted gold. If the number of gold storeys in the top half of the building is added to the number of black storeys in the bottom half of the building, the sum is 28. How many gold storeys are there in the top half of the building?

Y13/10 At a high school of the students are boys and of the seniors are boys. If of the boys are seniors then what fraction of the girls are seniors?

Y13/11 Seru is one-third of the way up a set of stairs. If he were to climb 11 more steps, he would be half way up. How many stairs are there in total?

Y13/12 The arithmetic mean of a set of 50 numbers is 38. If two numbers of the set, namely 45 and 55, are discarded, what will be the arithmetic mean of the remaining set of numbers?

Y13/13 A bag contains red, yellow, and green balls. Of the total, are red,  are yellow, and the remaining 70 balls are green. How many balls are in the bag?

Y13/14 Triangle has sides 10, 24, 26cm long. A rectangle that has an area equal to that of the triangle has width 3 cm. Find the perimeter of the rectangle.

Y13/15 Suppose three polling stations are in talks to work on a voter census. The first crew can complete the job in 36 days. The second crew can complete the same job in 12 days. If all the three crews work the job, they can complete it in 6 days. How long would it take for the third crew to do the job alone?

Y13/16 In the binomial expansion of, what is the coefficient of the term?

Y13/17 Esther is having her yard landscaped. She obtained an estimate from two landscaping companies. Company A gave an estimate of $240 for materials and equipment rental plus $55 per hour for labor. Company B gave and estimate of $280 for materials and equipment rental plus $45 per hour for labor. Determine how many hours of labor will be required for the two companies to cost the same.

Y13/18 Given that and, then what is the difference betweenand?

Y13/19 The sequence 9, 18, 27, 36, 45, 54, consists of successive multiples of 9. This sequence is then altered by multiplying every other term by –1, starting with the first term, to produce the new sequence –9, 18, – 27, 36, – 45, 54,... . If the sum of the first terms of this new sequence is 180, determine.

Y13/20 Tom and Jerry are each getting hired for a job. Tom wants to get paid $6.40 daily, but Jerry demands to be paid 10 cents on day 1, 20 cents on day 2, 40 cents on day 3, 80 cents on day 4, and so on. After how many whole days will Jerry’s total earnings exceed that of Tom’s?

Tie Breaker

Y13/21 How many different words can you form from the letters ABCD, where a word is a sequence of one to four letters, using every letter at most once (for example, words DC and CADB)?

Y13/22 There are 200 fish in an aquarium. 1% of them is blue, all the rest are yellow. How many yellow fish do we have to take out the aquarium so that blue fish represent 2% of all aquarium fish?