**FMA Team Mathematics Competition - Finals**

**YEAR 10 – 2017**

Y10/1 A Square field has 48 posts every 5m around it. What is the area of the field?

Y10/2 Find a pair of consecutive square numbers whose sum is a multiple of 17.

Y10/3 The mean age of three students is 20 years. All three of the students are at least 18 years old. What is the greatest possible age of the oldest student, in years?

Y10/4 A line with slope  passing through intersects a second line with slope at . What is the coordinate of the intercept of the second line?

Y10/5 If  and  what is the value of 

Y10/6 Find the degree measure of an angle whose complement is 25% of its supplement.

Y10/7 The mean, median, unique mode and range of a collection of eight integers are all equal to 8. What is the largest integer that can be the element of this collection?

Y10/8 William compares the price of a new computer at two different stores. Store A offers 15% off the sticker price followed by a $90 rebate. And store B offers 25% off the same sticker price with no rebate. William saves $15 by buying the computer at store A instead of store B. What is the sticker price of the computer, in dollars?

Y10/9 What is the volume of a cube whose surface area is twice that of a cube with volume ?

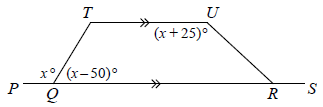
Y10/10 Roy bought a new Toyota Prius car. On a trip the car ran exclusively on its battery for the first 40km, and then ran exclusively on gasoline for the rest of the trip, using gasoline at a rate of 0.09 liters per km. On the whole trip he averaged 12 km per liter. How long was the trip in miles?

Y10/11 My internet connection is slow. The more files I download at once the slower it gets. At 1:00 pm I started downloading the three files simultaneously. At that point the time remaining to complete the downloads were given as 10, 8 and 4 minutes. At what time will the downloads all be finished?

Y10/12 How many times in one day do the hands of a clock form a right angle?

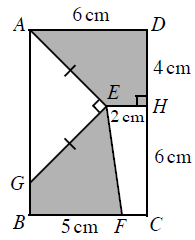
Y10/13 In the diagram, is parallel to and points and lie on . Also,

, , and . What is the measure of ?



Y10/14 A bag contains red, blue and purple marbles, and does not contain any other marbles. The ratio of the number of red marbles to the number of blue marbles is 4: 7. The ratio of the number of blue marbles to the number of purple marbles is 2: 3. There are 32 red marbles in the bag. In total, how many marbles are there in the bag?

Y10/15 In rectangle ABCD, what is the total area of the shaded region?



Y10/16 A car, van, truck and bike are all travelling in the same direction on the road. Each travels at a constant speed, but the speeds of the 4 vehicles may be different. At 10am the car overtakes the van. At noon it overtakes the truck. At 2 pm it overtakes the bike. At 4 pm the truck overtakes the bike. At 6 pm the van overtakes the truck. When does the van overtake the bike?

Y10/17 A cone has radius 1, height 6. A cube just fits inside the cone, with the bottom of the cube level with the bottom of the cone. What is the volume of the cube?

Y10/18 My mum drives me from home to school each morning and then she returns home. She takes the same route in both directions and does not stop. On the way to school her average speed is 60 km/h and on the way home her average speed is 40 km/h. what is her average speed for the entire trip?

Y10/19 Find a four digit even number (where are the four digits) such that 1.5 times equals the four digit number. ( is not allowed.)

Y10/20 At an elementary school, the students in year 3, year 4, and year 5 run an average of 12, 15, and 10 minutes per day, respectively. There are twice as many year 3’s as year 4’s, and twice as many year 4’s as year 5’s. What is the average number of minutes run per day by these students?

TIE BREAKER

Y10/21 Set  as 20 elements, and set  has 15 elements. What is the smallest possible number of elements in 

Y10/22 A Vodafone plan costs $20 each month, plus 5 cents per text message sent, plus 10 cents for each minute used over 30 hours. In January Mary sent 100 text messages and talked for 30.5 hours. How much did she have to pay?

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