**FMA TMC Zone**

**YEAR 12– 2016**

Y12/1 If points and are collinear, then what is the value of

Y12/2 You visit a mountain and drop a coin off the edge of a cliff.  The distance the penny will fall is 16 feet the first second, 48 feet the next second, 80 feet the third second, and so on in an arithmetic sequence.  What is the total distance the object will fall in 6 seconds?

Y12/3 A box is filled with candies in different colors. We have 40 white candies, 24 green ones, 12 red ones, 24 yellow ones and 20 blue ones. If we have selected one candy from the box without peeking into it, find the probability of getting a green or red candy.

Y12/4 Solve for .

Y12/5 The difference of two numbers is 3. Their sum is 13. Find the numbers.

Y12/6 The image of point under transformation by matrix is . Find the value of .

Y12/7 Solve the simultaneous equations to find the value of

Y12/8 A passenger plane made a trip to Las Vegas and back. On the trip there it flew 432 kmph and on the return trip it went 480 kmph. How long did the trip there take if the return trip took nine hours?

Y12/9 Working alone, Carlos can oil the lanes in a bowling alley in five hours. Jenny can oil the same lanes in nine hours. If they worked together how long would it take them?

Y12/10 There are  20  rows of seats in a concert hall with  20  seats in the first row,  21  seats in the second row,  22  seats in the third row, and so on. In total,  how many seats are there in the concert hall?

Y12/11  You complain that the hot tub in your hotel suite is not hot enough.  The hotel tells you that they will increase the temperature by 10% each hour.  If the current temperature of the hot tub is 75º F, what will be the temperature of the hot tub after 3 hours, to the *nearest tenth*of a degree?

Y12/12 The acceleration of a car is given by a = 6t and the velocity is 2 when t = 0, and the distance from home is 1 when t = 0. What is the distance from home as a function of time?

Y12/13 Akosita bought a big bag of mixed ***toffee*** and ***nut centre*** chocolates. She and 4 friends grabbed a handful of chocolates and started to eat them. These are the type of lollies they ate:

***toffee, toffee, nut, nut, toffee, toffee, toffee, toffee, nut, toffee.***

If the bag had 60 chocolates in it, how many nut centres would you expect?

Y12/14 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?

Y12/15 Solve for .

Y12/16 Given that , what is the value of

Y12/17 How many mg of a metal containing 45% nickel must be combined with 6 mg of pure nickel to form an alloy containing 78% nickel?

Y12/18 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?

Y12/19 Liz and Mary compete in solving problems. Each of them is given the same list of 100 problems. For any problem, the first of them to solve it gets 4 points, while the second to solve it gets 1 point. Liz solved 60 problems, and Mary also solved 60 problems. Together, they got 312 points. How many problems were solved by both of them?

Y12/20 Find the coordinates of the center of the circle with the equation

Tie Breaker

Y12/21 Ryan left the science museum and drove south. Gabriella left three hours later driving 42 km/h faster in an effort to catch up to him. After two hours Gabriella finally caught up. Find Ryan's average speed.

Y12/22 2 m³ of soil containing 35% sand was mixed into 6 m³ of soil containing 15% sand. What is the sand content of the mixture?