Year 11 Mathematics Specialist

2018 Revision Assignment 2

**Take Home**

***Instructions:*** *to be completed at home, Calculators are permitted.*

Time Allocation: 2 weeks (holiday), due \_\_\_/\_\_\_/2018 Total Marks: 48 marks

1. (8 marks: 2,6)

Let the complex numbers and , where k is a real number.

Determine all possible values of k if:

1. (6 marks: 1, 1, 2, 2)

A class has 30 students.

1. How many students need to be chosen at random to ensure that there are:
2. Two students who are born on the same day of the week?
3. Five students who are born on the same day of the week
4. There are at least x students who are born on the same day of the week.

Find x, justify your answer

1. There must be at least one day of the week which the birth day of no more than y students. Find y, justify your answer.
2. (5 marks)

Given that |**a|=** 20 and |**b**|=25, find with reasons the maximum value and minimum value of **a.b**.

1. (6 marks)

OABC is a trapezium with OA parallel to CB. P, Q, R and S are respectively the midpoints of OA, AB, BC and OC. Prove that the midpoints of the sides of the trapezium form a parallelogram, that is PQRS is a parallelogram.

(hint: draw the diagram)

1. (13marks: 4, 3, 6)
2. Prove that
3. Prove that
4. Prove that
5. (5 marks)

A trigonometric function has the equation Find the values of and b given that P has a maximum value of 4 when .

1. (5 marks)

Given that , with all non-zero elements, where |**M|=** 1 and **,** prove that *a +b=* -1