Christ Church Grammar School

2016
UNIT TEST 1

Year 11 Mathematics Specialist
Section One:
Calculator-free

Student name _____

Teacher name _____

Time and marks available for this section
Reading time before commencing work: 2 minutes
Working time for this section: 15 minutes
Marks available: 15 marks

Materials required/recommended for this section
To be provided by the supervisor
This Question/Answer Booklet
Formula Sheet

To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: nil

Important note to candidates
No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Instructions to candidates

1. Answer all questions.

2. **Show all your working clearly**. Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.

3. It is recommended that **you do not use pencil**, except in diagrams.

Question 1 **(6 marks)**

Given the true statements below, write the converse of each and decide whether or not the converse is True or False by circling your response.

(a) If it is snowing then it is cold. (2 marks)

Converse:

True or False

(b) If two triangles are congruent then their corresponding angles are equal in size. (2 marks)

Converse:

True or False

(c) If a set of points is equidistant from a fixed point then the points are on the circumference of a circle. (2 marks)

Converse:

True or False

Question 2 **(3 marks)**

Provide a counter-example to disprove each of the following conjectures:

(a) If $x^2 > 81$, then $x > 9$. (1 mark)

(b) If $x^2 = 100$, then $x = 10$. (1 mark)

(c) If $a > b$, then $\frac{1}{a} < \frac{1}{b}$. (1 mark)

Question 3 **(6 marks)**

(a) Determine what fraction of all possible arrangements of the letters of the word SELECTIONS begin with the letters EE. (2 marks)

(b) A bag contains 3 green, 5 red and 4 blue balls. What is the least number of balls that should be removed from the bag to be certain that the selection will contain at least three balls of the same colour? Justify your answer. (2 marks)

(c) Even numbers less than 6000 are to be formed using some, or all, of the digits 5, 6, 7, 8 and 9. How many even numbers less than 6000 can be formed in this way, if repetition of digits is not allowed? (2 marks)

End of Questions