Christ Church Grammar School

2018
UNIT TEST 6

MATHEMATICS METHODS Year 11

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. Write your answers in this Question/Answer Booklet.

2. Answer all questions.

3. You must be careful to confine your response to the specific question asked and to follow any instructions that are specific to a particular question.

4. Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

5. **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.

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

See next page

Additional working space

Question number:_____

Question 1 **(4 marks)**

A curve $y = f(x)$ passes through the point $(3,2)$ and has $f'(x) = 3 - x^2$.

Calculate the following:

(a) The equation of the curve. (3 marks)

(b) The value of y when $x = -1$. (1 mark)

See next page

Question 2 **(6 marks)**

S_n, the sum of the first n terms of an arithmetic sequence, is given by:

$$S_n = 17n - 3n^2$$

(a) Determine the sum of the first 10 terms of the arithmetic sequence. (1 mark)

(b) Show that the first and second terms of the arithmetic sequence are 14 and 8 respectively. (3 marks)

(c) Give a simplified expression, in terms of n, for the n^{th} term of the arithmetic sequence. (2 marks)

Question 3 **(5 marks)**

Two particles A and B are moving along a straight path so that their displacements x_A and x_B $metres$ relative to the origin O at time t $seconds$ ($t \geq 0$) are given by $x_A = 3t^2 + 5t - 10$ and $x_B = -2t^2 + 15t + 5$ respectively. Calculate the speeds of the two particles at the instant they collide.