Christ Church Grammar School

2015
UNIT TEST 1

Year 12 MATHEMATICS 3CD
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. **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.

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

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Question 1 **(4 marks)**

(a) Simplify using factorial notation the term ${}^{n}\mathrm{C}_{3}$. (1 mark)

(b) Evaluate the value of ${}^{5}\mathrm{P}_{3}$. (1 mark)

(c) Evaluate the value of $\frac{0!\,10!}{3!\,8!}$. (1 mark)

(d) Simplify in terms of n the expression $\frac{(n+1)!}{(n+1)(n-1)!}$. (1 mark)

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Question 2 **(7 marks)**

(a) Determine $\frac{dy}{dx}$ in each of the following. Do not simplify your answers.

(i) $y = \frac{5x^4}{2x-3}$. (2 marks)

(ii) $y = (x^2 - 4)^3$. (2 marks)

(b) Find the coordinates of the points on the curve $y = x^3 - 2x^2 - 5x + 1$ where $\frac{d^2y}{dx^2} = 2.$ (3 marks)

Question 3 **(4 marks)**

$y = x + 1$ is a tangent to the curve $y = ax^2 + bx$ at the point (1, 2). Find the value of a and of b.

End of questions