**PERTH COLLEGE**

**YEAR 12**

**Semester One Examination, 2010**

**Question/Answer Booklet**

**MATHEMATICS 3CMAT/3DMAT**

**Section One: Calculator-free**

**Student Name:**

**Time allowed for this section**

Reading time before commencing work: 5 minutes

Working time for this section: 50 minutes

**Material required/recommended for this section**

**To be provided by the supervisor**

This Question/Answer Booklet

Formula Sheet which may also be used for Section Two

**To be provided by the candidate**

Standard items: pens, pencils, pencil sharpener, eraser, correction fluid, ruler, highlighters

Special items: nil

**Important note to candidates**

No other items may be used in this section of the examination. 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.

**Section One: Calculator-free (40 marks)**

**Structure of this paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Working time (minutes) | Marks available |
| Section One:Calculator-free | 7 | 7 | 50 | 40 |
| Section Two:Calculator-assumed | 13 | 13 | 100 | 80 |
|  |  |  |  | 120 |

**Instructions to candidates**

1. The rules for the conduct of Western Australian external examinations are detailed in the Year 12 Information Handbook 2010. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in the spaces provided in this Question/Answer Booklet. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

* + Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
	+ Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question(s) that you are continuing to answer at the top of the page.

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.

**Question 1 [ 6 marks ]**

Given f(x) =  , g(x) = and h (x) = x2.

Determine:

(a) f o g (x) [1]

(b) (g o h ) (1) [2]

(c) the domain and range of f o g(x). [3]

**Question 2 [ 6 marks ]**

Differentiate the following, without simplifying:

(a) y = 4x5 + [2]

(b) y = (5e2x + 1)3  [2]

(c) y =  [2]

**Question 3 [ 5 marks ]**

The probabilities of two events A and B are such that

P(A) = 0.6, P (A  B) = 0.8 and P(B | A) = 0.5.

(a) Find

 (i) P(A  B) [2]

 (ii) P(B) [1]

(b) Are the events A and B independent? Justify your answer. [2]

**Question 4 [ 9 marks]**

The graph of the function y = f(x) on the interval −3 ≤ x ≤ 5 is given below.

(a) A, B, C and D are four points on the graph of y = f(x). Determine whether the first and

 second derivatives are positive, negative or equal to zero at these points. Record your

 answers in the table below. [4]

|  |  |  |
| --- | --- | --- |
| Point | f ' | f '' |
| A |  |  |
| B |  |  |
| C |  |  |
| D |  |  |

(b) Indicate on the graph of y = f(x) above, the two other points of inflection, and label

 them as E and F. [1]

(c) Sketch the graph of y = f '(x) on the axes provided below the graph of y = f(x).

 [3]

(d) State the coordinates of the global maximum and global minimum points of y = f(x)

 on the interval -3 ≤ x ≤ 5. [1]

**Question 5 [ 7 marks ]**

(a) Determine the following indefinite integrals: (answer with positive indices)

|  |
| --- |
|  (i)  [2] |
|  |  |  |
|  (ii)  [2] |

(b) Evaluate and give your answer in terms of e. [3]

**Question 6 [ 4 marks ]**

Solve the system of equations x − y − z = 0

 x + 2y + z = 1

 3x + y − 2 z = 8

**Question 7 [ 3 marks ]**

Solve the inequality 5≥ **** where x ≠ 2.

**END OF SECTION ONE**

EXTRA PAGE FOR WORKING