Year 12 MATHEMATICS 3CD
Section Two:
Calculator-assumed

Student name _____

Teacher name _____

Time and marks available for this section
Reading time before commencing work: 3 minutes
Working time for this section: 30 minutes
Marks available: 30 marks

Materials required/recommended for this section
To be provided by the supervisor
This Question/Answer Booklet
Formula Sheet (retained from Section One)

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

Special items: drawing instruments, templates, and up to three calculators approved for use in the WACE examinations

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.

Question 4 **(5 marks)**

How many arrangements are there of the word SUBIACO in each of the following?

(a) The letters can be in any order. (1 mark)

(b) The letters A, B and C must be together. (2 marks)

(c) The letters A and B must be separated by at least one other letter. (2 marks)

Question 5 **(6 marks)**

In a chess club, there are 10 boys and 5 girls. Four players are to be chosen to represent the club. How many possible ways are there in each of the following situations?

(a)   2 boys and 2 girls are chosen. (1 mark)

(b)   4 players are chosen to play on Board 1, 2, 3 and 4 respectively. (1 mark)

(c)   4 players are chosen to form a first pair and a second pair, with 2 players in each pair. (2 marks)

(d)   4 players are chosen to form 2 pairs, with 2 players in each pair. (2 marks)

See next page

Question 6 **(6 marks)**

The digits 1, 2, 3, 4, 5 and 6 are used to make 4-digit passcodes.
How many 4-digit passcodes are possible if

(a)   there are no restrictions. (1 mark)

(b)   there are no repetition of digits. (1 mark)

(c)   there are no repetitions and the passcodes must be even numbers. (2 marks)

(d)   there are no repetitions, the passcodes must be greater than 3000 and are odd
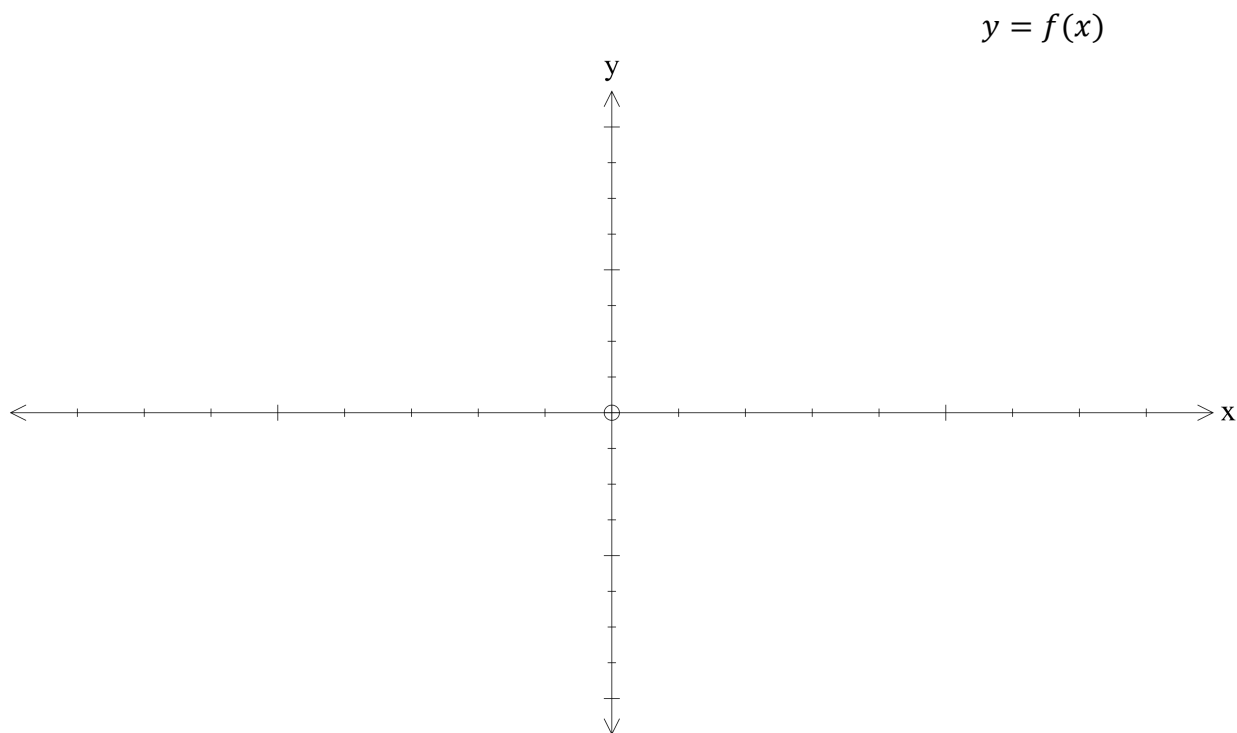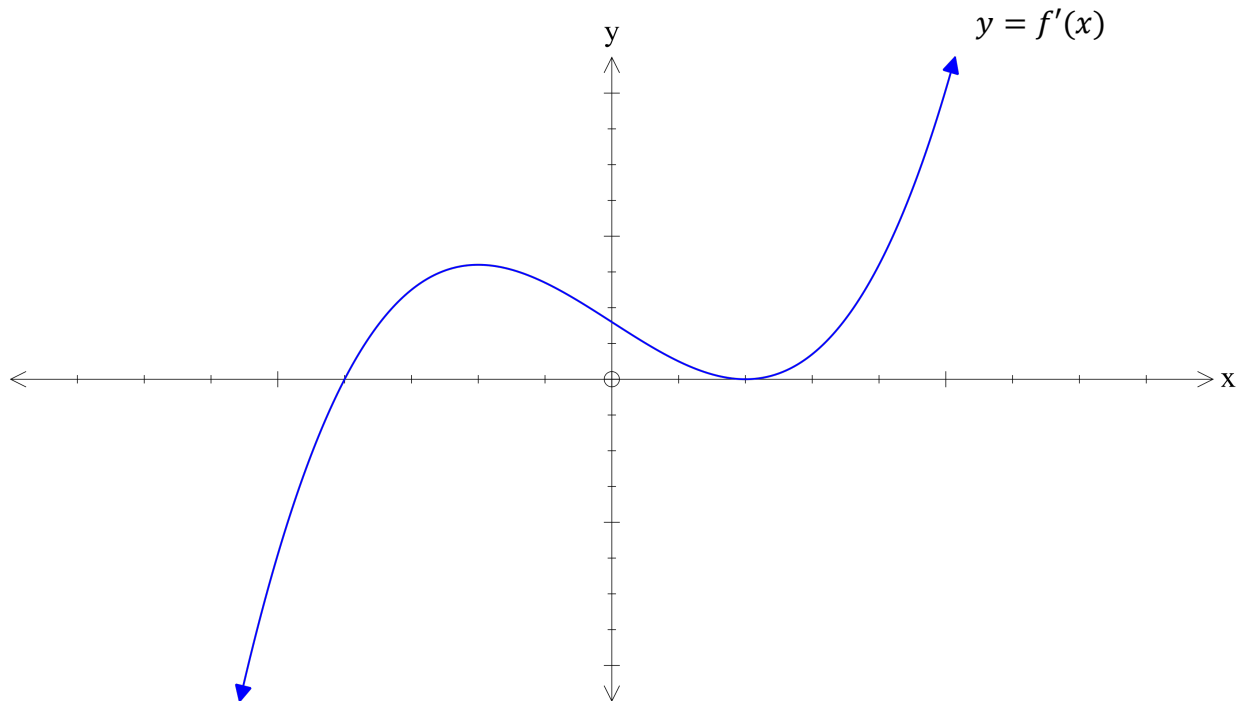   numbers. (2 marks)

Question 7   **(2 marks)**

Find the equation of the tangent to the curve $y = \dfrac{x^2 - \sqrt{x}}{x}$ at the point $\left(4, \dfrac{7}{2}\right)$.

Question 8 **(4 marks)**

The first diagram below shows the graph of $y = f'(x)$.
On the blank axes in the second diagram, sketch the possible graph of $y = f(x)$.

$y = f'(x)$

$y = f(x)$

Question 9   **(7 marks)**

The table below contains information about the sign of $f(x)$, $f'(x)$ and $f''(x)$ at six points on the graph of the continuous function $f(x)$. Apart from those in the table, there are no other points where $f(x)$, $f'(x)$ or $f''(x)$ are equal to zero.
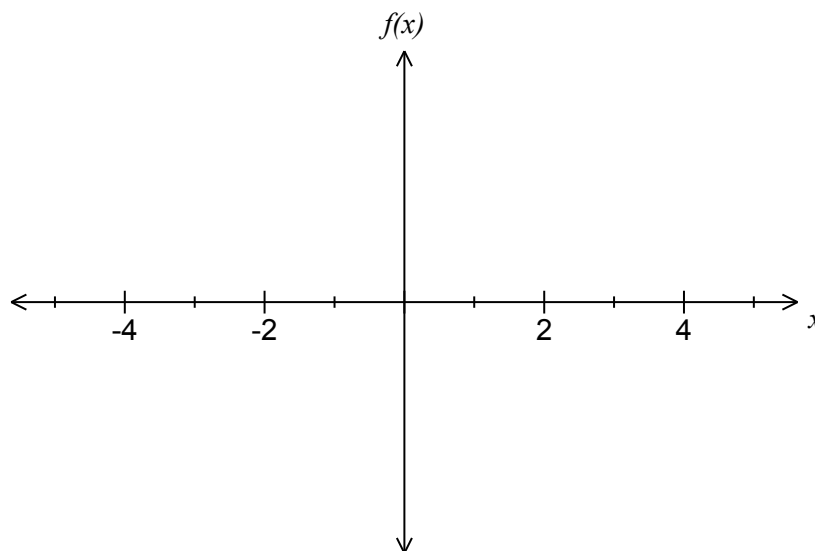
x	-3	-1	0	2	3	4
$f(x)$	-	0	+	+	0	-
$f'(x)$	+	0	+	0	-	-
$f''(x)$	-	0	+	-	-	-

(a) Describe the nature of the graph when $x = 2$.   (1 mark)

(b) At what point is $f(x)$ increasing at an increasing rate?   (1 mark)

(c) Describe the nature of the graph when $x = -1$.   (1 mark)

(d) Sketch the function on the axes below.   (4 marks)

End of questions