

Mathematics

Semester One Examination, 2017

Teacher's name _____
Your name _____

METHODS
UNIT 1
SECTION ONE:
Calculator-free

Question/Answer booklet

Materials required/recommended for this section
Reading time before commencing work: five minutes
Working time: fifty minutes
Reading time: five minutes
Working time: fifty minutes
To be provided by the supervisor
To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
No other items may be taken into the examination room. It is *your responsibility* to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Special items: n/a

To be provided by the candidate
Formula sheet
This Question/Answer booklet
To be provided by the supervisor
Materials required/recommended for this section
Reading time before commencing work: five minutes
Working time: fifty minutes
To be provided by the supervisor
To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
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Structure of this paper

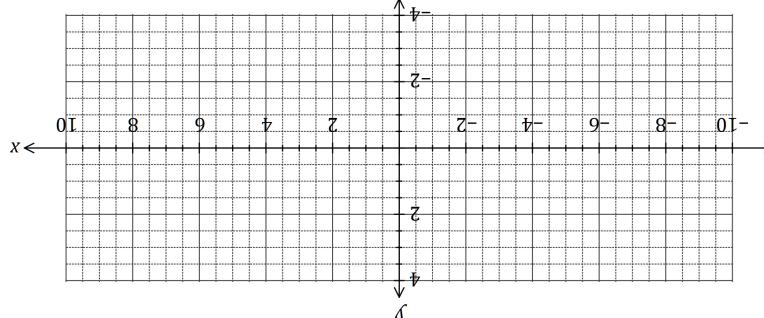
Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Marks available	Percentage of examination
Section One: Calculator-free	7	7	50	52	35
Section Two: Calculator-assumed	11	11	100	85	65
Total					100

Additional working space

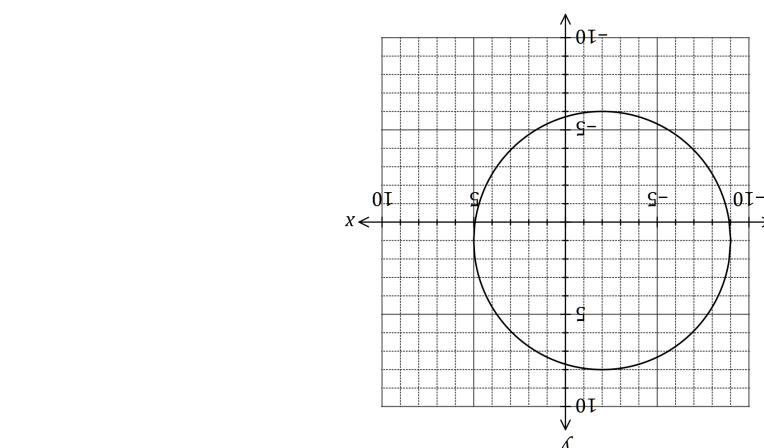
Question number: _____

Instructions to candidates

1. The rules for the conduct of examinations are detailed in the school handbook. Sitting this examination implies that you agree to abide by these rules.
2. Write your answers in this Question/Answer booklet.
3. You must be careful to confine your response to the specific question asked and to follow any instructions that are specified to a particular question.
4. Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.
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 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.
7. The Formula sheet is not to be handed in with your Question/Answer booklet.

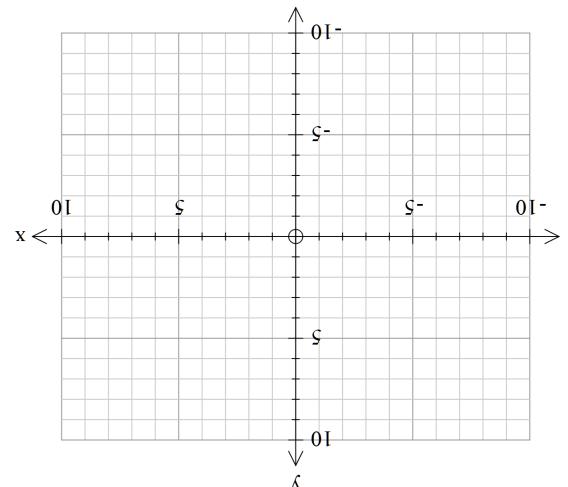


- Question 1
- (a) On the axes below, sketch the graph of the relation $y^2 = x$, labelling all key features with their coordinates or equations. (3 marks)



- (b) Determine the equation of the circle shown below. (3 marks)

(b) Hence sketch $y = x^3 - 2x^2 - 5x + 6$ showing x and y intercepts. (4 marks)



- Question 7
- Section One: Calculator-free
Section Two: Calculator-free
35% (52 Marks)
- Working time: 50 minutes.
- This section has seven (7) questions. Answer all questions. Write your answers in the spaces provided.

- (a) Divide the polynomial $x^3 - 2x^2 - 5x + 6$ by $x - 1$ (4 marks)

Question 2

- (a) The point $M(8, 1)$ is the midpoint of A and $B(20, 7)$. Determine the coordinates of A .
(2 marks)

Question 6

- (a) For the graph with equation $y=(x+1)(x-3)$, determine the coordinates of
(i) all axes intercepts.
(2 marks)

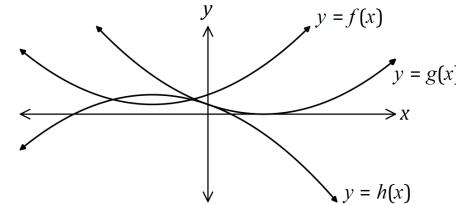
- (ii) the turning point.
(2 marks)

- (b) A relationship between x and y is given by $x=2y-3$.

- (i) Determine y when $x=25$.
(1 mark)

- (ii) State, with justification, whether x is a function of y .
(2 marks)

- (b) The graphs of three quadratic functions with discriminants of 0, 1 and -2 are shown below.



- (i) Underneath each function in this table, write the value of its discriminant.
(2 marks)

Function	$f(x)$	$g(x)$	$h(x)$
Discriminant			

- (ii) Clearly explain your choices in part (i).
(2 marks)

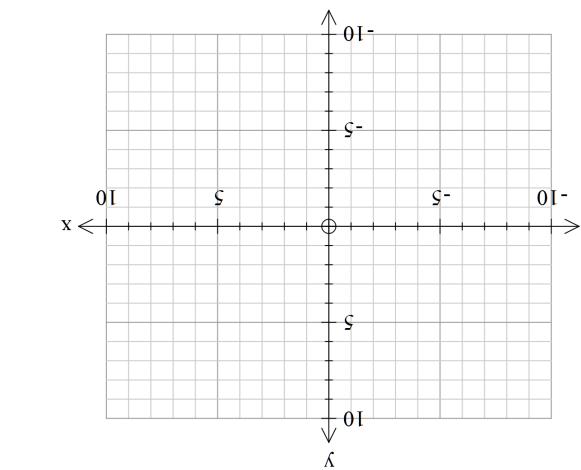
- Question 5
 (c) A straight line passes through points $C(2, -5)$ and $D(-2, 2)$. Determine the equation of the straight line that is perpendicular to this line and passes through C , expressing your answer in the form $ax + by + c = 0$, where a , b and c are integers.
 (4 marks)

(a) Determine the new function if $f(x)$ is translated 4 units to the right and 2 units up.
 Let $f(x) = \frac{1}{x}$

(6 marks)

CALCULATOR-FREE

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- (b) Sketch the transformed function in (a) above on the axes below.
 (4 marks)

(7 marks)

Question 3Solve each of the following equations for the variable x .

(a) $5x - 6 = 9$

(2 marks)

(b) $3(1-x)+4=2(2x-7)$.

(2 marks)

(c) $\frac{4}{x} \cancel{3} + x.$

(3 marks)

(8 marks)

Question 4(a) Solve the equation $x^3 = 7x^2 + 30x$.

(4 marks)

(b) The graph of $y = ax^3 + bx^2 + cx + d$ is shown below. Determine the values of the constants a, b, c and d .