



Christ Church
Grammar School

2019
TEST 2

MATHEMATICS METHODS Year 11

Section One: Calculator-free

Your name _____

Teacher's name _____

Time and marks available for this section

Reading time for this section:	3 minutes
Working time for this section:	30 minutes
Marks available:	32 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.

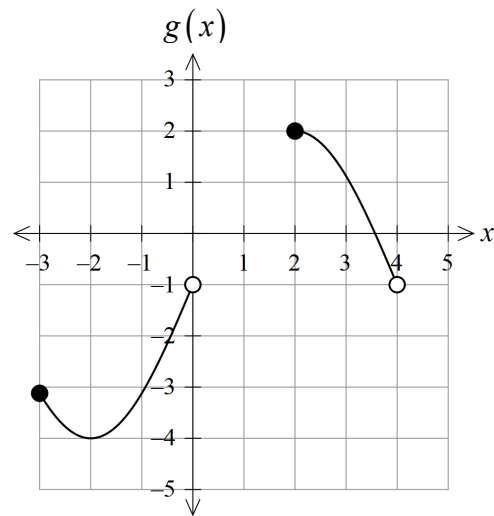
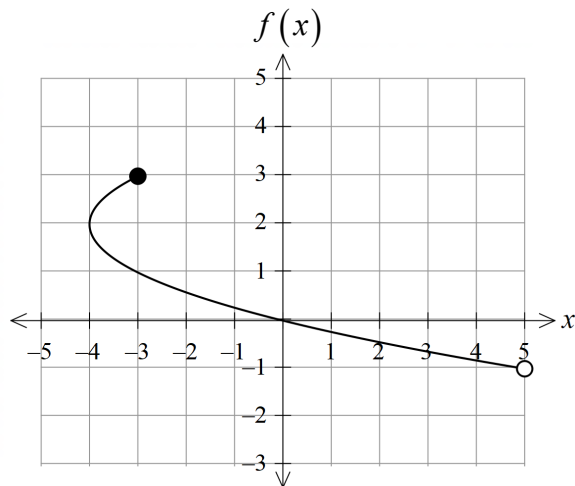
Instructions to candidates

1. The rules of conduct of the CCGS assessments are detailed in the Reporting and Assessment Policy. Sitting this assessment implies that you agree to abide by these rules.
2. Write your answers in this Question/Answer Booklet.
3. Answer all questions.
4. 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.
5. 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.
6. **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.
7. It is recommended that **you do not use pencil**, except in diagrams.

Question 1

(6 marks)

The graphs of relations f and g are shown below.



(a) Which of the relations f or g is NOT a function. Explain. (2 marks)

(b) State the domain of relation f . (2 marks)

(c) State the range of relation g . (2 marks)

Question 2

(6 marks)

Solve exactly the following equations:

(a) $\frac{5}{x-3} = \frac{3}{x+4}$ (3 marks)

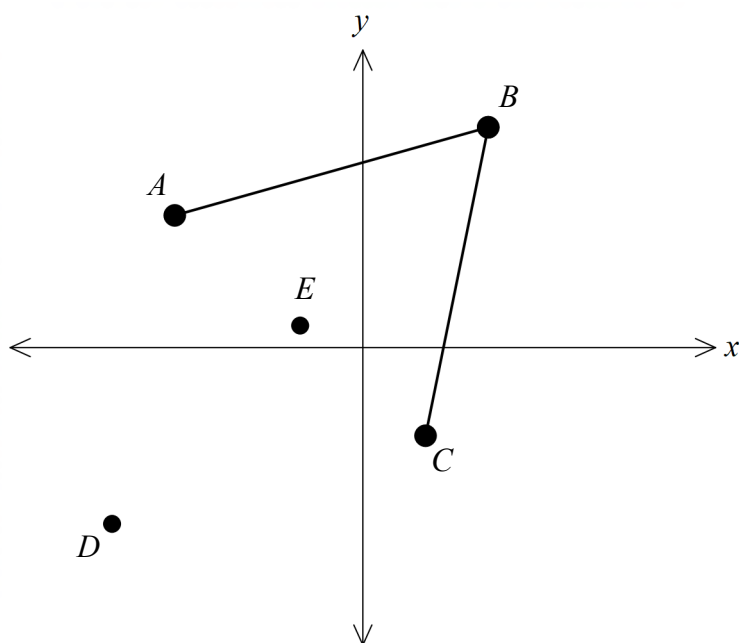
(b) $x(x-12) = -5$ (3 marks)

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Question 3

(10 marks)

The graph indicates points $A (-3,3)$, $B (2,5)$ and $C (1,-2)$. Point D is positioned so that $ABCD$ is a parallelogram. Point E is the midpoint of both \overline{AC} and \overline{BD} since it is a property of a parallelogram that the diagonals bisect each other. The coordinates of E are $(-1,0.5)$.



(a) Determine the equation for \overline{BC} in the form $y = mx + c$. (3 marks)

(b) Using the coordinates of $E (-1,0.5)$, determine the coordinates for point D . (2 marks)

Consider a line containing C and perpendicular to \overline{AB} .

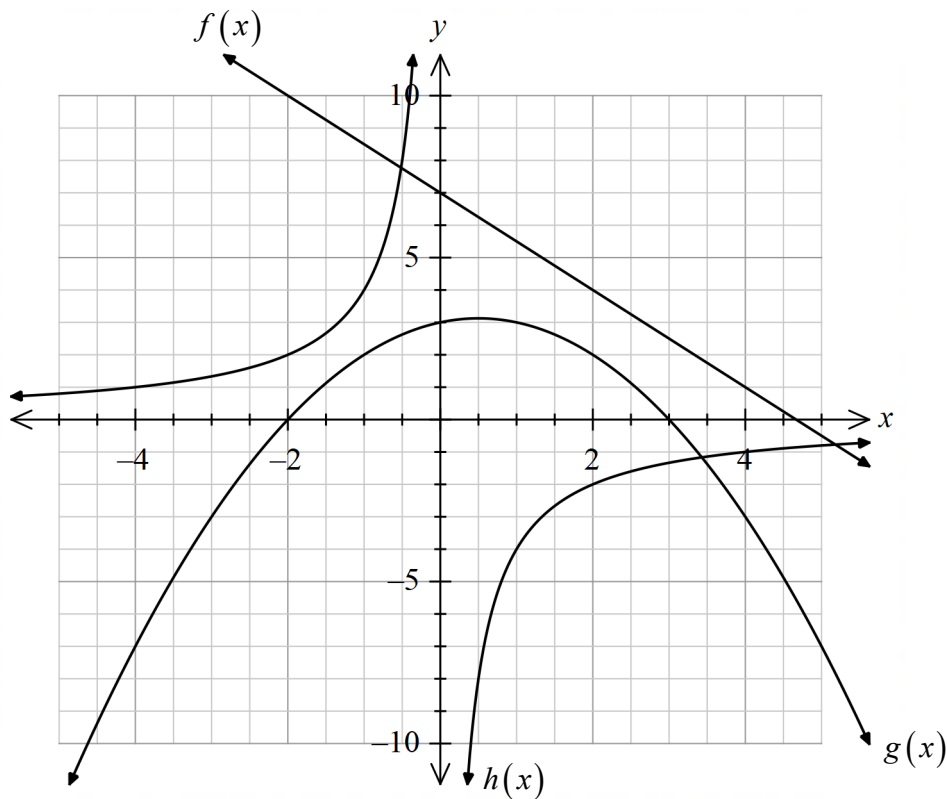
(c) Determine the equation for this perpendicular line. (3 marks)

(d) Show that $ABCD$ is NOT a rectangle. (2 marks)

Question 4

(7 marks)

The diagram below shows the graphs of functions $f(x)$, $g(x)$ and $h(x)$.



Determine the defining rules for function:

(a) $f(x)$. (2 marks)

(b) $g(x)$. (3 marks)

(c) $h(x)$. (2 marks)

Question 5**(3 marks)**

The graph of $y = kx^2 + 4x + k$ has no x intercepts.
Determine the value(s) of the constant k .

End of Calculator Free Questions

Additional working space

Question number: _____



MATHEMATICS METHODS Year 11

Section Two:

Calculator-assumed

Your name _____

Teacher's name _____

Time and marks available for this section

Working time for this section: 10 minutes

Marks available: 10 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, notes on one unfolded sheet of A4 paper and up to three calculators approved for use in the WACE examinations

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Question 6**(4 marks)**

The pressure P , measured in kPa , exerted by a certain mass of gas at room temperature is inversely proportional to its volume V , measured in *litres*.

This particular amount of gas exerts a pressure of $2.75 kPa$ when its volume is $4.5 litres$.

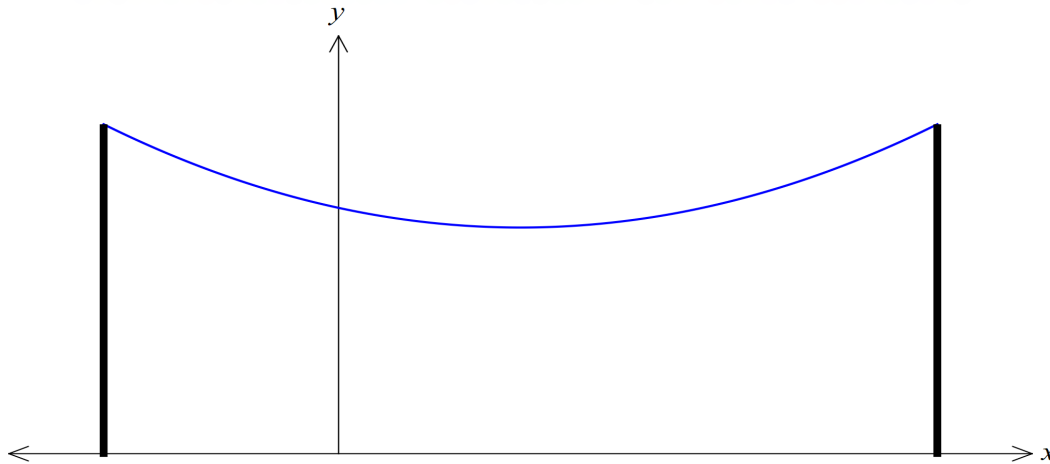
(a) Express the relationship between the pressure P and the volume V . (2 marks)

(b) If the volume of this gas is reduced by $0.7 litres$, determine the increase in the pressure of the gas, correct to 2 decimal places. (2 marks)

Question 7**(6 marks)**

A high voltage power line is supported by support towers that are each 6.7 m in height. The 'sag' in the power line is defined to be the vertical distance the power line is below 6.7 m

The height of the power line between the towers is modelled by the quadratic function $y = 0.004x^2 - 0.08x + 5$ as shown below.



- (a) Determine the distance between the support towers, correct to the nearest 0.01 metres
(3 marks)
- (b) Determine the maximum sag in the power line, correct to the nearest 0.01 metres.
(3 marks)

End of Questions

Additional working space

Question number: _____

Additional working space

Question number: _____