

Important note to candidates

- The items and the solutions/marking keys are to be kept confidentially and not copied or made available to anyone who is not a teacher at the school. Teachers may give feedback to students in the form of showing them how the work is marked but students are not to retain a copy of the paper or the marking guide until the agreed release date stipulated in the purchasing agreement.
- They are not to be shared in any manner with a school which has not purchased their own licence.
- The items that are contained in this examination are to be used solely in the school for which they are purchased.
- They are not to be sold within the school that purchases this licence.

Special items: nil

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

To be provided by the supervisor:
 Materials required/recommended for this section
 Formula Sheet

Working time for this section: fifty minutes
 Reading time before commencing work: five minutes

Time allowed for this section

Teacher Name:

Student Name/Number:

Section One: Calculator-free

MATHEMATICS METHODS**Question/Answer Booklet****Semester 1 (Unit 1) Examination, 2015****Acknowledgements**

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Marks available	Percentage of exam
Section One: Calculator-free	7	7	50	60	35
Section Two: Calculator-assumed	11	11	90	96	65
					100

Instructions to candidates

1. The rules for the conduct of School exams are detailed in the *School/College assessment policy*.
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 responses to the specific questions asked and to follow any instructions that are specific to a particular question.
4. 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 that you are continuing to answer at the top of the page.
5. **Show all 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.

Additional working space

Question number: _____

Question 7

SEMESTER 1 (UNIT 1) EXAMINATION

CALCULATOR-FREE

MATHEMATICS METHODS

SEMESTER 1 (UNIT 1) EXAMINATION

CALCULATOR-FREE

MATHEMATICS METHODS

Section One: Calculator-free

(60 Marks) Weighting 35%

This section has **7 (seven)** questions. Answer all questions. Write your answers in the spaces provided.

Suggested working time: **50 minutes.**

Question 1

A box with six doors, forms part of a maze. In how many ways is it possible for a mouse to enter by one door, and leave by another?

(1 mark)

(b)

A pack of 7 cards numbered 1,2,3,5,7,11,13 is shuffled and 2 cards are randomly drawn. The order in which the 2 cards are drawn is not relevant.

(i) How many pairs of numbers form the sample space?

(1 mark)

(ii) Determine the probability that the product of the two numbers will be even.

(2 marks)

(iii) State the probability that the product of the two numbers will be prime.

(2 marks)

(iv) State the probability that the sum of the two numbers will be prime.

(3 marks)

(a)

The diagram below shows a unit circle with angle $\theta = \frac{7\pi}{6}$ and $\sin \theta = -0.5$ as marked.

(b)

State the value of θ in degrees.

(1 mark)

(c)

State exact values for $\cos \theta$ and $\tan \theta$.

(4 marks)

(d)

Given $\cos \theta = -\frac{1}{\sqrt{2}}$, $-180^\circ \leq \theta \leq 180^\circ$, determine the value(s) for θ . (2 marks)

End of Questions

**CALCULATOR-FREE
SEMESTER 1 (UNIT 1) EXAMINATION**

(9 marks)

Question 2

Solve the following equations

$$\frac{x+3}{4} - \frac{x-3}{5} = \frac{x}{2}$$

(3 marks)

(3 marks)

$$(b) \quad x^2 + x - 72 = 0$$

(2 marks)

$$(c) \quad x^2 - 4x + 1 = 0 \quad (\text{by completing the square})$$

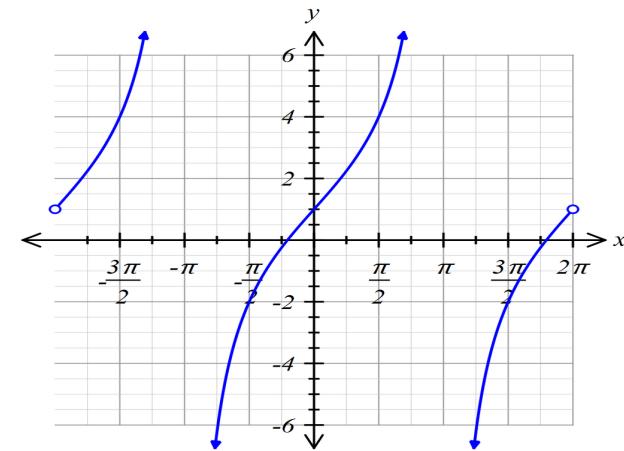
(4 marks)

Question 6

(a) State the equation of the graph drawn below

**CALCULATOR-FREE
SEMESTER 1 (UNIT 1) EXAMINATION**

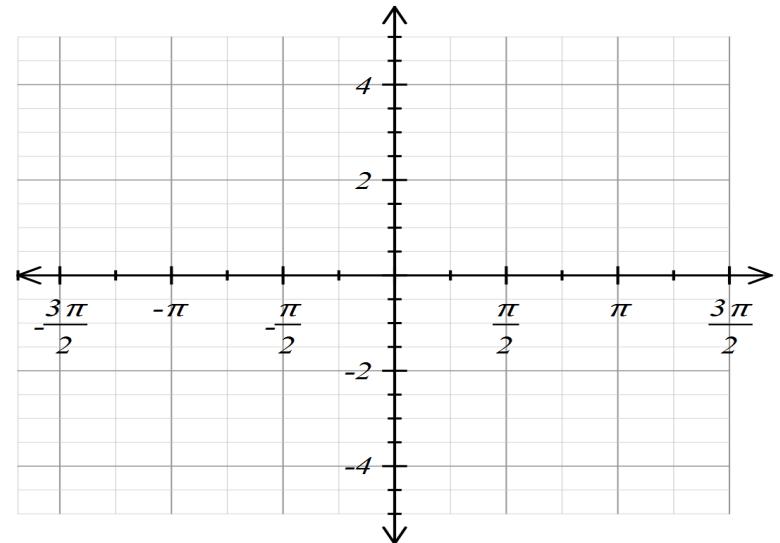
(9 marks)

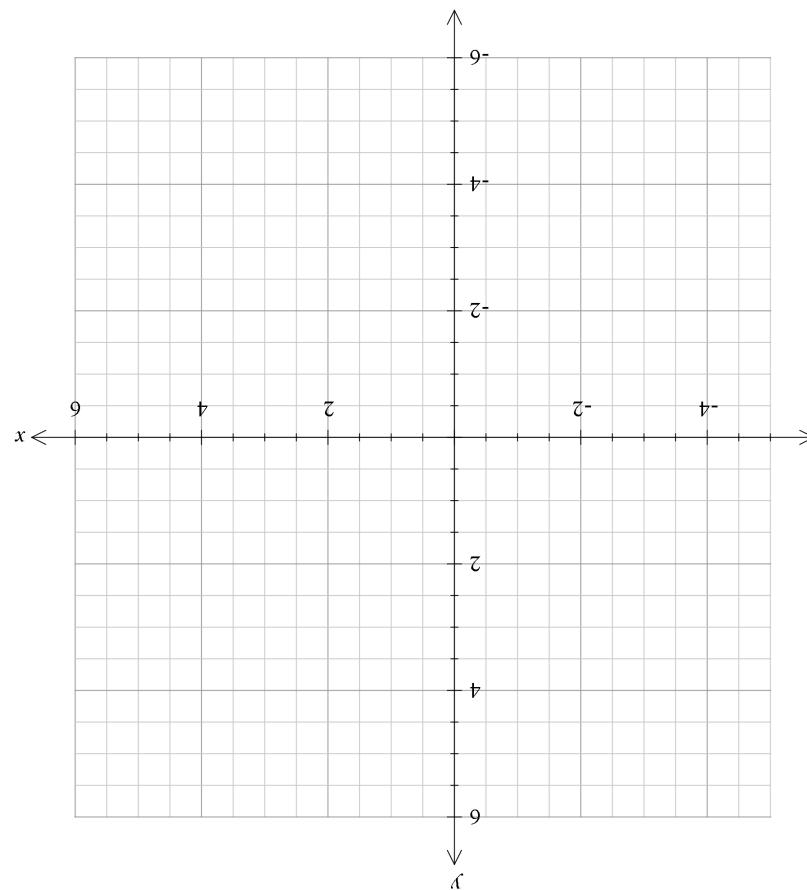


(b) On the axes below, sketch the graph of

$$f(\theta) = 3\cos 2(\theta - \frac{\pi}{2}) \text{ for } -\pi \leq \theta \leq \pi$$

(5 marks)





$$2x + 3y = 6, \quad y = -\frac{2}{3}x - 2, \quad (x - 2)^2 + (y - 4)^2 = 4$$

Sketch the following on the axes below showing clearly all key features.

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CALCULATOR-FREE**

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Question 3

(7 marks)

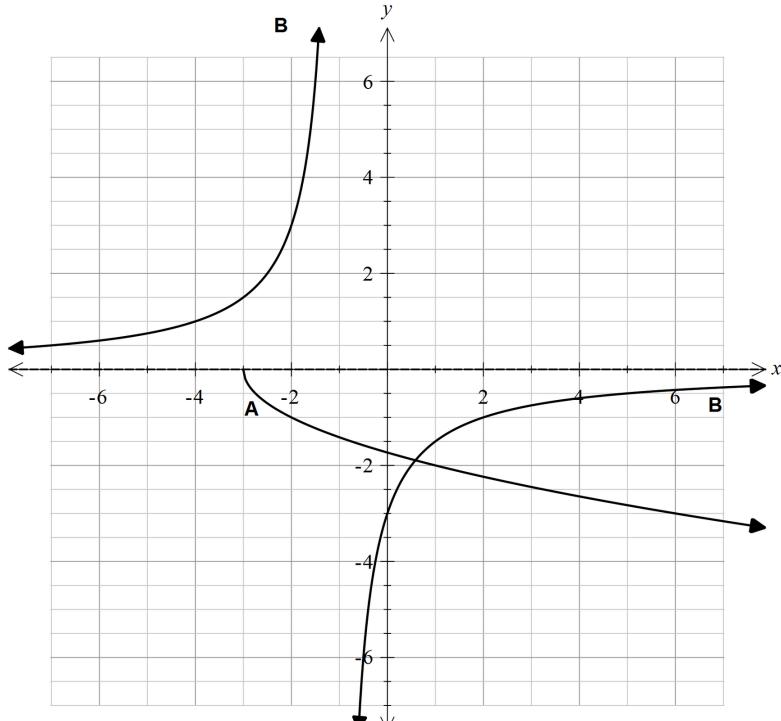
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Question 4

Determine the equation of each of the graphs, shown below.

**A:**

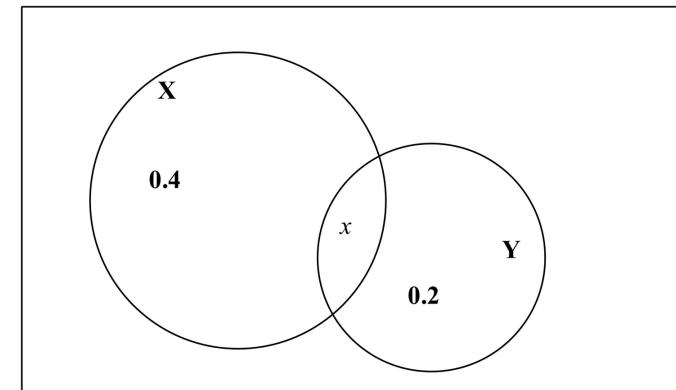
(2 marks)

B:

(3 marks)

Question 5

The Venn diagram below represents the probability sample space for two random events X and Y .



(a) If $P(X \cup Y) = 0.9$,

(i) calculate $P(X)$.

(2 marks)

(ii) Are events X and Y independent? Justify your answer.

(3 marks)

(b) If $P(X|Y) = \frac{2}{7}$, calculate

(i) $P(X)$

(4 marks)

(ii) $P(\overline{X \cup Y})$

(2 marks)