



WAEP Semester One Examination, 2018

Question/Answer booklet

**MATHEMATICS
METHODS UNIT 1**

If required by your examination administrator, please
place your student identification label in this box

Section One: Calculator-free

Student number: In
figures

In words _____

Your name _____

Time allowed for this section

Reading time before commencing work: five minutes

Working time: fifty minutes

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 material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

METHODS UNIT 1 2 CALCULATOR-FREE

Structure of this paper

Section	Number of questions	Number of questions to be answered	Working time (minutes)	Marks available	Percentage of examination

	available				
Section One: Calculator-free	8	8	50	52	35
Section Two: Calculator-assumed	13	13	100	98	65
				Total	100

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. 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.
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.

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CALCULATOR-FREE 3 METHODS UNIT 1

Section One: Calculator-free 35% (52 Marks)

This section has **eight (8)** questions. Answer **all** questions. Write your answers in the spaces provided.

Working time: 50 minutes.

Question 1 (5 marks) (a) Solve $5(2x + 1) - 3(x - 4) = 0$ for x . (2 marks)

(b) Solve

$$x^2 - 5 - 4x^3 = 0 \text{ for } x. \text{ (3 marks)}$$

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METHODS UNIT 1 4 CALCULATOR-FREE

Question 2 (5 marks) Solve the following equations.

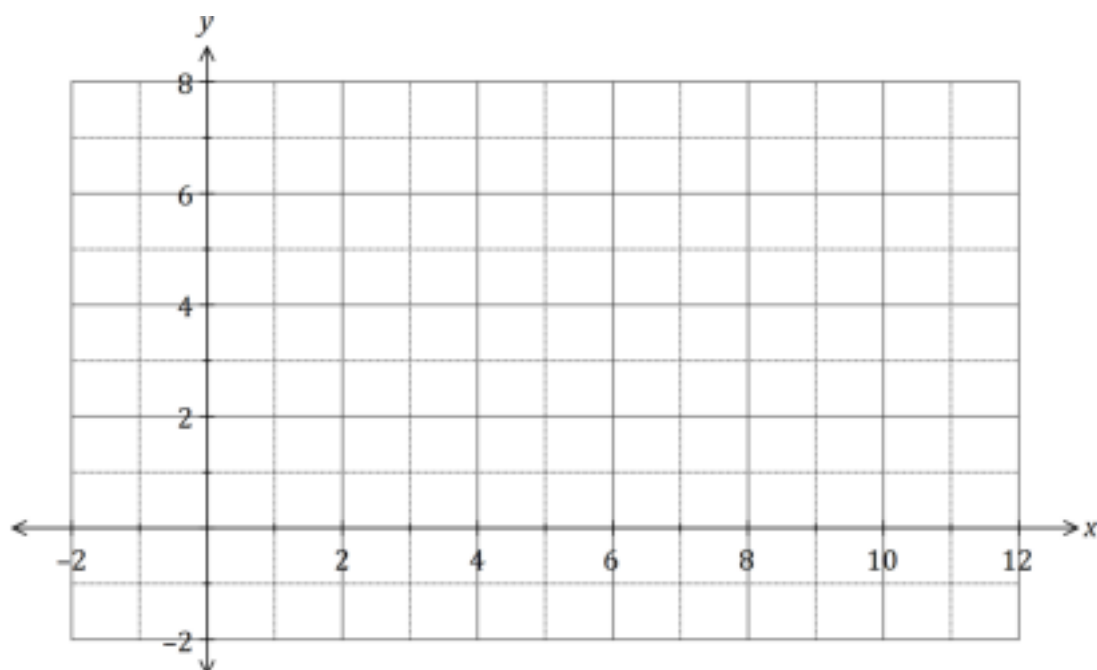
(a) $6x^2 = 3x$. (2 marks) (b) $x(x + 2) = 24$. (3 marks)

CALCULATOR-FREE 5 METHODS UNIT 1

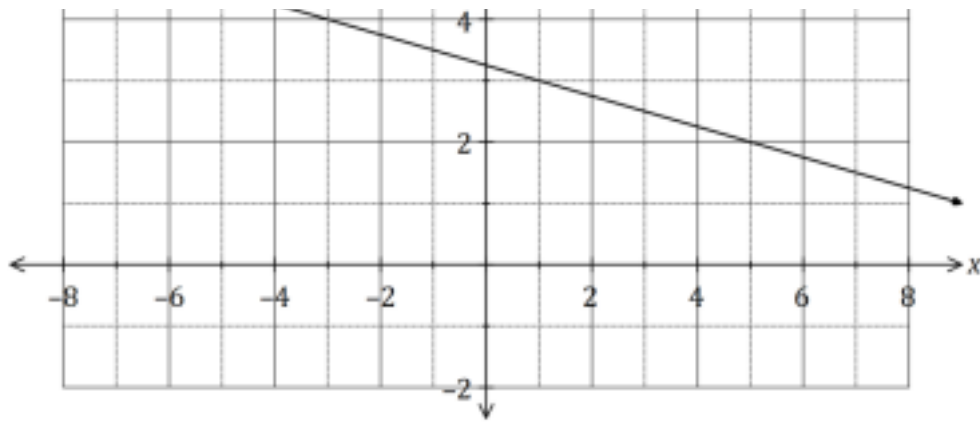
Question 3 (6 marks) A function is defined by $f(x) = \sqrt{3x}$.

(a) Calculate $f(12)$. (1 mark) (b) State the domain and range of $f(x)$. (2 marks)

(c) Sketch the graph of $f(x) = \sqrt{3x}$ on the axes below. (3 marks)

**METHODS UNIT 1 6 CALCULATOR-FREE**

Question 4 (5 marks) The graph of the line $y = x + 1$ is shown below.



(a) Determine the

equation of ℓ_1 . (2 marks)

Two points are located at $P(-10, 5)$ and $Q(6, 29)$.

(b) Line ℓ_2 is perpendicular to ℓ_1 and passes through the mid-point of P and Q .
Determine the equation of ℓ_2 . (3 marks)

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CALCULATOR-FREE 7 METHODS UNIT 1

Question 5 (6 marks) (a) Expand and simplify $(x^2 + 2)(2x^2 - 5)(x - 2)$. (2 marks)

- (b) One solution to the equation $x^3 + 36 = 5x^2 + 12x$ is $x = 2$. Determine all other solutions. (4 marks)

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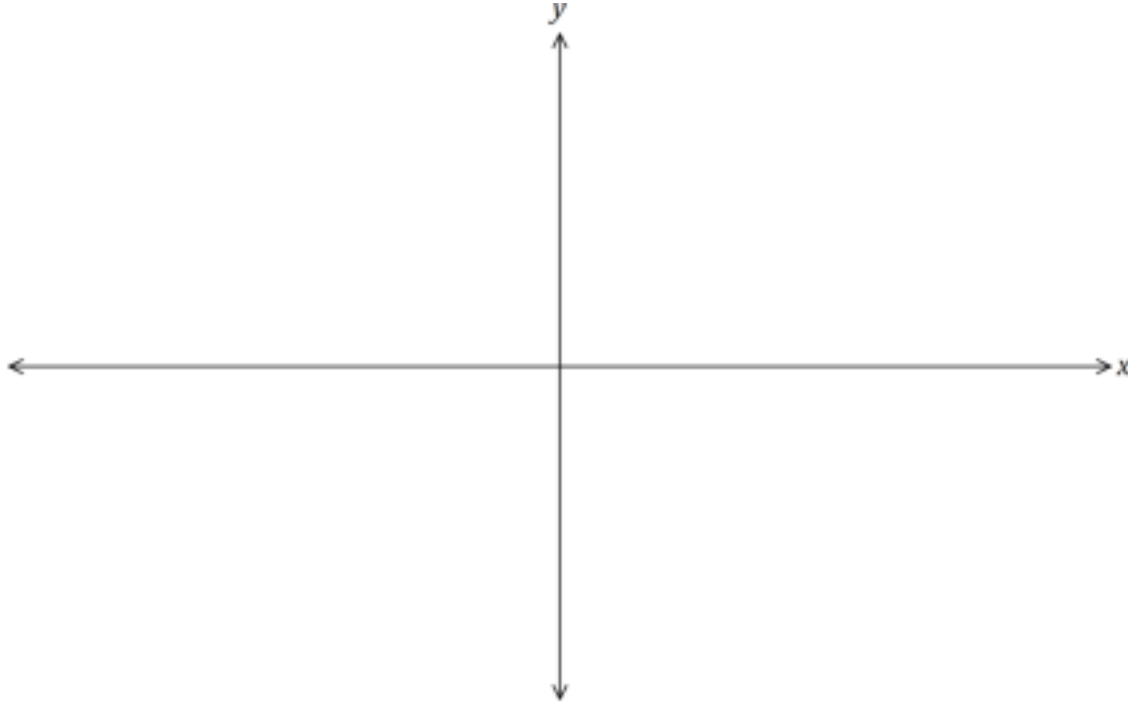
METHODS UNIT 1 8 CALCULATOR-FREE

Question 6 (9 marks) (a) Solve the equation $\sqrt{3} \tan(x) - 3 = 0$ for $0 \leq x \leq 2\pi$. (3 marks)

(b) A function has a period of π and is defined by $f(x) = 4 \cos(2x)$.

(i) State the value of $f(\frac{\pi}{4})$. (1 mark) (ii) State the amplitude of $f(x)$. (1 mark)

(iii) Sketch the graph of $y = x(x-1)$ over the domain $-1 \leq x \leq 1$. (4 marks)



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See next

CALCULATOR-FREE 9 METHODS UNIT 1

Question 7 (9 marks)

(a) The tenth row of Pascal's triangle begins with the numbers 1, 10, 45, 120, 210, 252 and so on.

(i) State the value of $\binom{10}{4}$. (1 mark) (ii) Deduce the value of $\binom{11}{3}$. (2 marks)

(iii) Calculate the sum of all the terms in the ninth row of Pascal's triangle. (2 marks)

(b) The coefficient of the x^2 term in $x^3 + 5x^2 - 3x + 1$ is 5. Determine the coefficient of the x^2 term in the expansion of

(i) $(3x - 5)^2$. (1 mark) (ii) $(2x + 2)^4$. (3 marks)

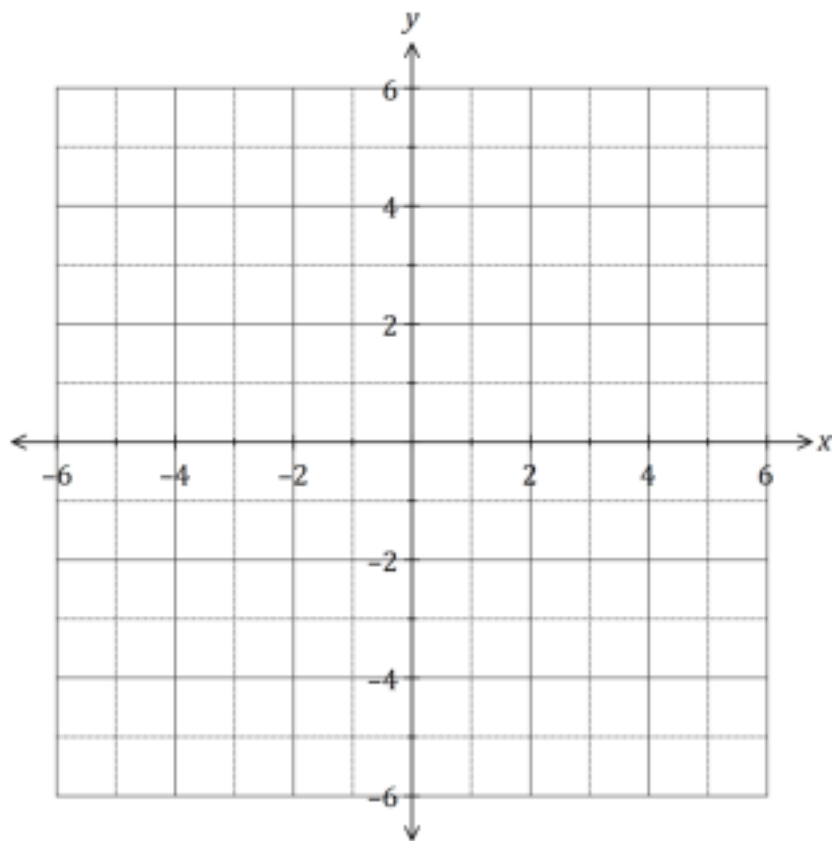
METHODS UNIT 1 10 CALCULATOR-FREE

Question 8 (7 marks)

- (a) The graph of the relation $x^2 = ay$ passes through the points $(16, a)$ and $(a, -5)$. Determine the values of a and b . (3 marks)

- (b) Another relation is defined by $(x - 1)^2 + (y + 2)^2 = 4$.

- (i) Sketch the graph of this relation on the axes below. (3 marks)



- (ii) What feature of the graph indicates that a relation rather than a function is shown? (1 mark)

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Question number: _____

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