Published by WA Examination Papers
PO Box 445 Claremont WA 6910

Rossmoyne Senior High School

WA Exams Practice Paper B, 2015

Question/Answer Booklet

MATHEMATICS METHODS UNITS 1 AND 2

Section One: Calculator-free

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

Student Number: In figures | | | | | | | | |

In words _____

Your name _____

Time allowed for this section

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

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	52	35
Section Two: Calculator-assumed	13	13	100	98	65
			Total	150	100

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2015*. 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. 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 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.

See next page

Additional working space

Question number: _____

Question 7 **(6 marks)**

(a) Determine the coefficient of the x^3 term in the expansion of $(3-2x)^5$. (2 marks)

(b) Solve $\sin 2x = \frac{1}{2}$ for $0 \le x \le 90$. (2 marks)

(c) Simplify $\cos\left(\frac{\pi}{7}\right)\cos\left(\frac{\pi}{5}\right) + \sin\left(\frac{\pi}{7}\right)\sin\left(\frac{\pi}{5}\right)$. (2 marks)

End of questions

Section One: Calculator-free **(52 Marks)**

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

Working time for this section is 50 minutes.

Question 1 **(8 marks)**

A quadratic function is given by $f(x) = (x-2)^2 - 9$.

(a) The function can also be written in the form $f(x) = x^2 + bx + c$. Determine the values of b and c. (2 marks)

(b) Solve the equation $f(x) = 0$. (2 marks)

(c) For the graph of $y = f(x)$, state:

(i) the coordinates of the turning point. (1 mark)

(ii) the equation of the line of symmetry. (1 mark)

(iii) the coordinates of all axes intercepts. (2 marks)

See next page

Question 2 **(7 marks)**

(a) Determine the coordinates of the midpoint of A(-12, 3) and B(8, -9). (1 mark)

(b) Are the straight lines given by $3x + 4y = 12$ and $y = 0.75x + 1.25$ parallel, perpendicular or neither? Justify your answer. (2 marks)

(c) Determine the equation of the straight line perpendicular to the line $y = 8 - \frac{1}{3}x$ and passing through the point (2, 1). (2 marks)

(d) Solve $2(3x - 2) = \frac{2x + 11}{2}$. (2 marks)

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

Question 6 **(9 marks)**

(a) Differentiate the following with respect to t:

(i) $x = 1 + t - t^2$. (1 mark)

(ii) $v = \frac{t^2}{6} + \frac{4t^3}{9}$. (1 mark)

(b) State whether the graph of $y = x^3 - 2x^2 - 3x - 2$ is increasing, decreasing or stationary at the point (-1, 1). Justify your answer. (2 marks)

(c) The tangent to the curve $y = f(x)$ at the point A is $13x + 3y + 14 = 0$.

If $f'(x) = \frac{x^3}{2} - \frac{1}{3}$ find

(i) the coordinates of point A. (3 marks)

Question 3 **(7 marks)**

(a) Evaluate 0.00007^2, writing your answer in scientific notation. (1 mark)

(b) Determine the value of n if $\frac{1}{\sqrt[4]{x^3}} = x^n$. (2 marks)

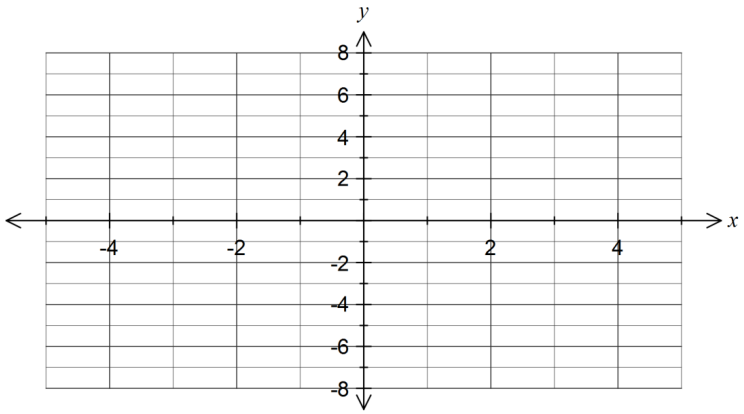
(c) Solve

(i) $8^{2x} = 4\sqrt{2}$. (2 marks)

(ii) $\sqrt[3]{(4x-1)} + 2 = 0$ (2 marks)

Question 4 **(8 marks)**

(a) Sketch the graph of $y = 0.5(x-2)^3 - 1$. (3 marks)

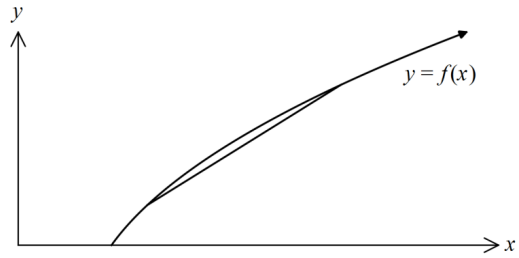


(b) Expand $(3x-1)(3x+1)(x+3)$. (2 marks)

(c) Solve $x^3 + 6x^2 + 5x - 12 = 0$. (3 marks)

Question 5 **(7 marks)**

The graph of $y = f(x)$ and a chord of the graph from (2.5, 7.5) to (5.5, 19.5) is shown below.



(a) Use the ratio $\frac{f(x+h)-f(x)}{h}$ to determine the gradient of the chord. Clearly state the values of x and h that you use. (2 marks)

(b) As the value of h used in (a) decreases towards zero and the value of x remains unchanged, will $\frac{f(x+h)-f(x)}{h}$ increase, decrease or stay the same? Explain your answer. (2 marks)

(c) Clearly describe what feature of the graph of $y = f(x)$ will be found by evaluating $\lim_{h\to 0}\left(\frac{f(x+h)-f(x)}{h}\right)$ when $x = 4$. (2 marks)

(d) On the axes above, draw the tangent to the graph of $y = f(x)$ at the point (2.5, 7.5). (1 mark)