PERTH MODERN SCHOOL
Exceptional schooling. Exceptional students.

MATHEMATICS 3A/3B

Section One: Calculator-free

Student Name _____

Teachers Name _____

Year _____

Student Number: In figures [ ][ ] [ ][ ][ ] [ ][ ][ ]

In words   _____

_____

Time allowed for this section
Reading time before commencing work: 5 minutes
Working time for this section: 50 minutes

Material 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, pencils, pencil sharpener, eraser, correction fluid, ruler, highlighters

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.

See Next Page

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Marks available
Section One: Calculator-free	10	10	50	40
Section Two Calculator-assumed	14	14	100	80
				120

Instructions to candidates

1.   The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2010*. Sitting this examination implies that you agree to abide by these rules.

2.   Write your answers in the spaces provided in this Question/Answer Booklet. 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(s) that you are continuing to answer at the top of the page.

3.   **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.

4.   It is recommended that you **do not use pencil** except in diagrams.

Section One: Calculator-free **(40 Marks)**

Question 1 **[1, 1, 1 marks]**

Given the word CATS how many three letter 'words' can be formed which:

a) contain A?

b) start with T?

c) have A and C together?

Question 2 **[2 marks]**

Simplify the following expression.

Give your answer in exact form, as a base of 2.

$$\frac{2^{n+1} + 2^{n-1}}{2^{n}}$$

See next page

Question 3   [1, 2, 2, marks]

Simplify the following <u>expressing your answers with positive indices.</u>

a) $\dfrac{1}{3g^{-4}}$

b) $\dfrac{3m^{-2}}{(-2m)^3}$

c) $\left(\dfrac{a^{\frac{3}{5}}b^{-\frac{2}{5}}}{ab^{-\frac{4}{5}}}\right)^{-2}$

See next page

Question 4   **[2 marks]**

State the domain and range for the function $y = \sqrt{x-2}$.

Question 5   **[1, 1 marks]**

For the function: $y = f(x) = 100 - 2x^2$, find:

a) $f(-a)$

b) $f(a-1)$

See next page

Question 6   [2, 3 marks]

Describe the sequence of transformations required to convert y = f(x) into   y = g(x).

a) $f(x) = x^2$ and $g(x) = (x – 2)^2 + 4$

b) $f(x) = x^3$ and $g(x) = -(2x)^3 + 4$

Question 7   [1, 1 marks]

Chèvre cheese is made of goats' milk and is very expensive, costing $48.95 per kilogram. With the new government unit pricing policy, this price must be displayed in a $/100g format.

Convert the cheese price to

i)   its **unit price**.

ii)   a cost of cents / gram.

Question 8   [2, 1, 1 marks]

3000 people were surveyed to determine their favourite fruit from a choice of apples (A) and bananas (B). The people surveyed were asked to indicate their fruit preference as either apples, bananas, both or none of these. The company conducted the survey to determine the probability of future purchases of apples and bananas.

Their figures based on the survey showed that $P(A \cup B) = 0.8$, $P(A) = 0.3$ and $P(B) = 0.7$.

Draw a Venn diagram to represent this information.

a)   Hence or otherwise, find $P(A \cap B)$.

b)   Find how many people indicated in the survey that they like both apples and bananas and could not choose between them.

Question 9   [2, 3, 2 marks]

In each of the following solve for x.

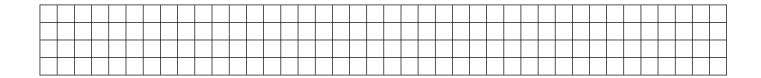a) $2^{3x-2} = 64$

b) $9^{2-x} = 27^x$

c) $\dfrac{2^{2x+1}}{2^{1-x}} = 4$

See next page

Question 10   **[2, 6 marks]**

a)   For the set of scores   2, 5, 1, 3, 9, 10, 3, x

        Find the value of x, if the

        i)   mean is 5

        ii)   mode is 3.

b)   Given the set of scores   10, 14, 8, 9, 11, 20, 16, 21, 36, 15

        i)   construct a box and whisker plot, clearly labelling the median, quartiles, minimum and maximum.

        ii)   calculate the interquartile range.

        iii)   determine if any outliers exist, giving reason(s) for your decision.

Spare Page

Spare Page