Rossmoyne SHS Mathematics Department	MATHEMATICS 3A MAT	Semester 1 2011 EXAMINATION

NAME:

TEACHER: Belonogoff Benko Fletcher Goh Longley Pui

(Circle one name) Rigelsford Robinson Tanday Tay White Whyte

Section One: Calculator-free

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

Special items: nil

Important note to candidates

No other items may be used in this section of the examination. 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
Section One: Calculator-free	10	10	50	40
Section Two: Calculator-assumed			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 2011*. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions in the spaces provided.

   Section One: Write answers in this Question/Answer Booklet. Answer **all** questions.

   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.

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

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(s) that you are continuing to answer at the top of the page.

QUESTION	MARKS AVAILABLE	STUDENT MARK
1	5	
2	3	
3	2	
4	3	
5	7	
6	5	
7	5	
8	3	
9	2	
10	5	
TOTAL	40	

SECTION A

NO CALCULATORS PERMITTED FOR THIS SECTION

TIME 50 minutes

AVAILABLE MARKS 40 marks

Question 1 (1,2,1,1 marks)

(a) Determine the possible value/s of x in each of the following:

(i) $|x| = -10$

(ii) $|x - 3| = 9$

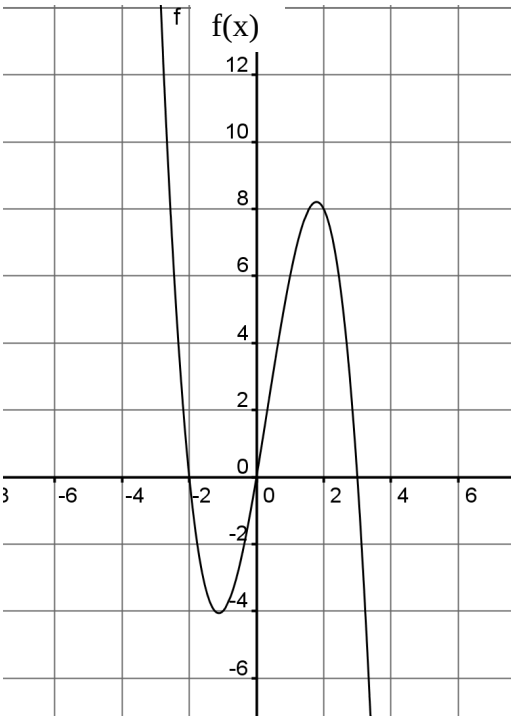
(b) Solve the following equations:

(i) $(3^7 \times 3^{-4})^3 = 3^{2n+1}$

(ii) $\dfrac{2^5 \times 2^3}{2^{11}} = 2^{-n}$

Question 2 (2,1 marks)

(a) Determine the equation of the function, f(x), below:



(b) Hence, solve $f(x)=0$.

Question 3 (2 marks)

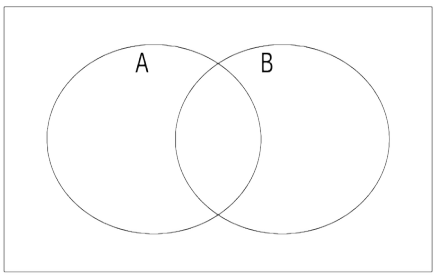
(a) A sequence is defined recursively as:

$T_{n+3} = T_{n+2} + 2T_{n+1} - T_n$ where $T_1 = 7, T_2 = 10$ *and* $T_3 = 6$

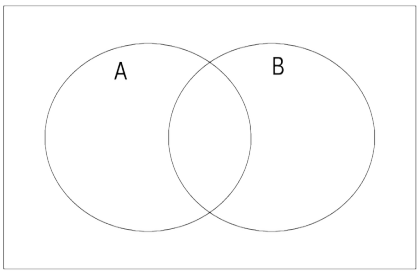
Determine the fourth and fifth terms of the sequence.

Question 4 (1,2 marks)
Shade the following descriptions on the Venn Diagrams provided.

(a) $\overline{A} \cap \overline{B}$



(b) $(A \cup \overline{B}) \cap (\overline{A} \cup B)$

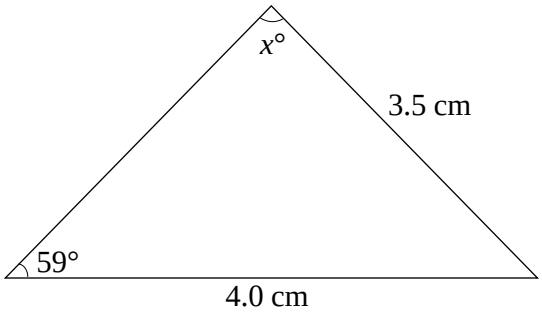


Question 5 (1,1,1,1,1,1,1 marks)

For the diagrams on the right (below),

(a)

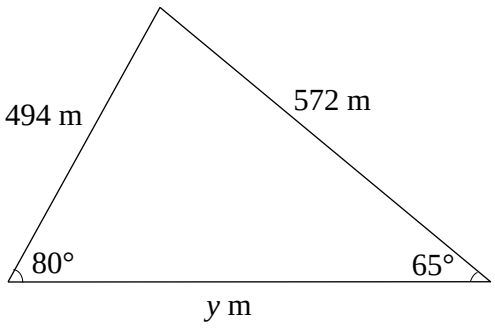
(i) Write an equation that will allow you to solve for the value of x. (Do NOT solve it.)



(Diagram not drawn to scale)

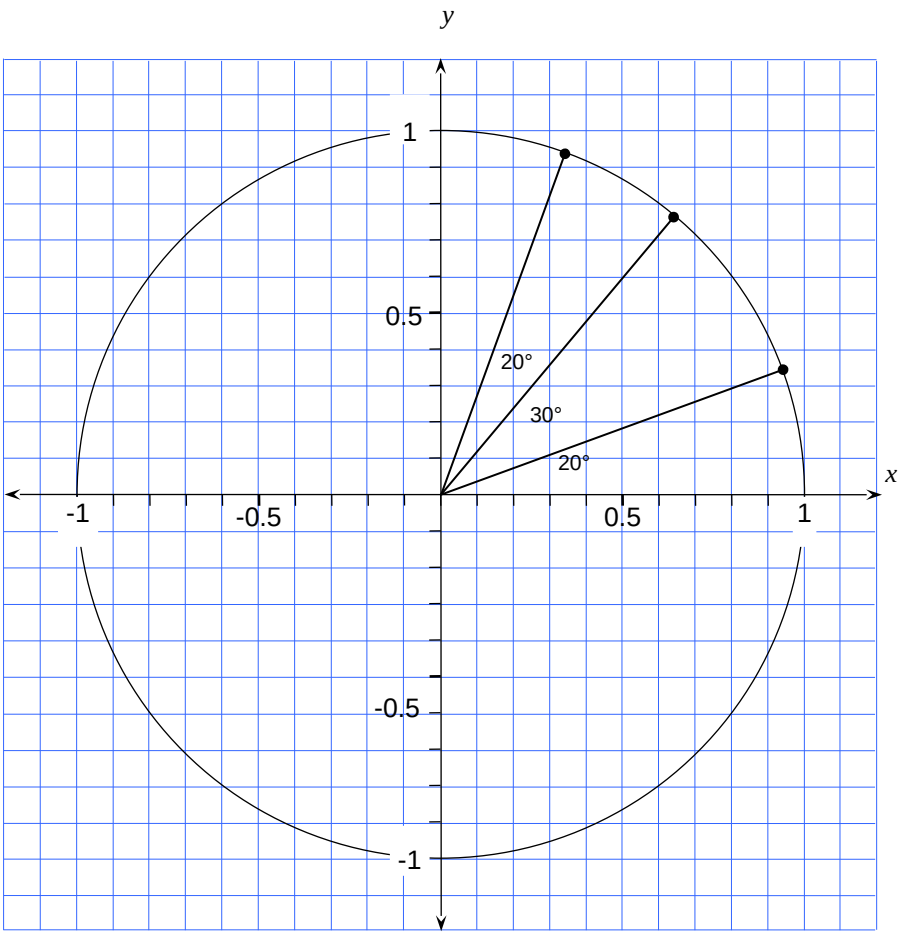
(ii) Given that $x^\circ \approx 78^\circ$ is a solution to the equation in (i) above. State another value of x°, in degrees, (if any) that will satisfy the same given measurements? Explain why you were able or not able to find another value of x° in this situation.

(b) Write an equation that will allow you to solve for y. (Do NOT solve it).



(Diagram not drawn to scale)

(c) Use the unit circle diagram below to determine the approximate value of each of the following trigonometric ratios:



(i) sin 20^o

(ii) sin 160^o

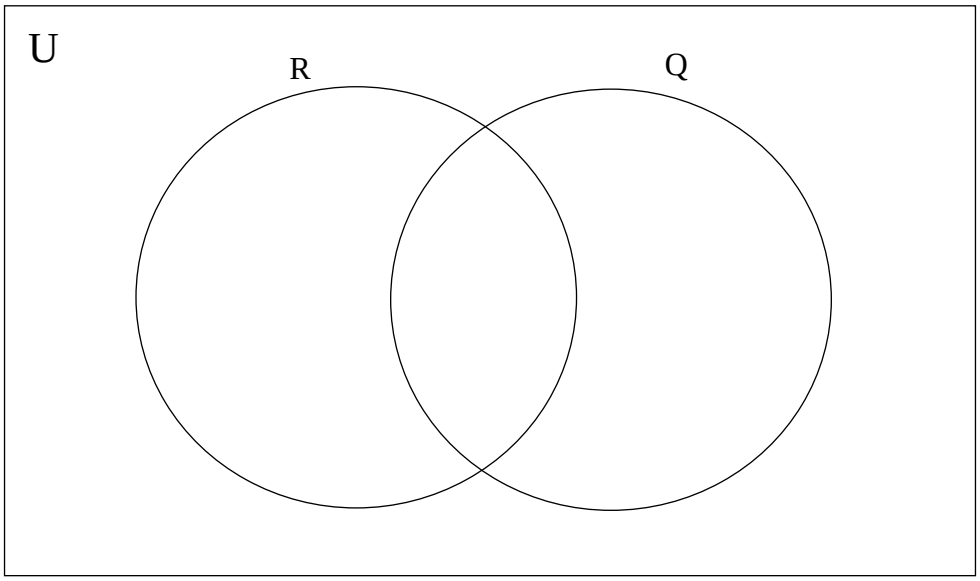
(iii) cos 50^o

(iv) cos 130^o

Question 6 (5 marks)

If Q = {odd numbers}, R = {prime numbers} and U (the universal set) is the set of digits, :

(a) Complete the Venn diagram below to show this information.



(b) Determine:

(i) $\overline{R}$

(ii) $Q \cap R$

(iii) $\overline{Q \cup R}$

(iv) $\overline{Q} \cap \overline{R}$

Question 7 (1,1,1,1,1 marks)

In order to finish her driver's licence test, Dolly has to answer three 'true' or 'false' questions.

(a) Use a tree diagram to show all the possible ways Dolly could answer the questions. (Use T = true and F = false)

If she gets more than one wrong, she fails the test. If the correct answer for each question was 'True' (T), determine the probability of:

(b) getting all three correct

(c) passing the test

(d) passing the test if she knew the answer to the first question

(e) getting one question wrong given that Dolly passed the test

Question 8 (1,1,1 marks)

Six members of the Math Quest Prize Winners have to arrange themselves in line for a photograph. The members are: Aaron, Bree, Charlie, Dylan, Evelyn and Freddy.

How many arrangements are there in which:
(You may leave your answer in factorial form.)

(a) Aaron is at the left end?

(b) Aaron is at the left end *or* Freddy is at the right end?

(c) Aaron and Freddy are not next to each other?

Question 9 (2 marks)

Holly scores 26, 35 and 19 marks in three assessments in mid term, respectively. If the mean and standard deviation in each of these assessments are as given below, determine if she has improved in her performance? Justify your answer.

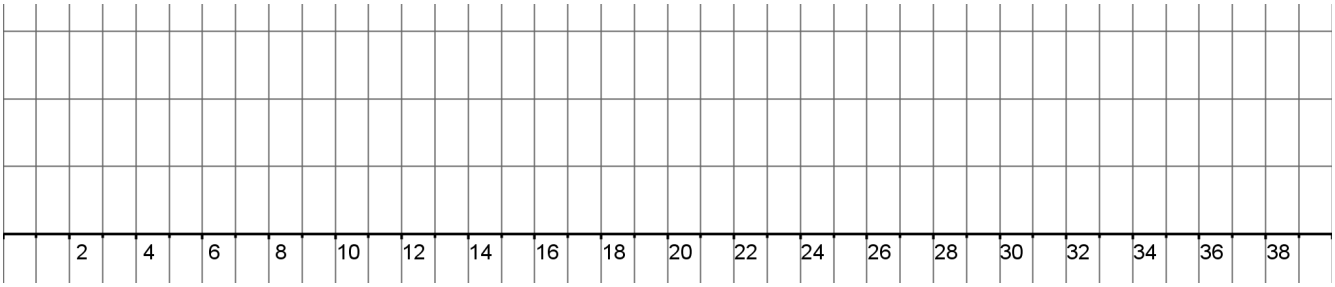
Assessment 1:	mean 34	standard deviation 8
Assessment 2:	mean 32	standard deviation 6
Assessment 3:	mean 17	standard deviation 2.5

Question 10 (3,2 marks)

(a) Determine the median, lower quartile and upper quartile for the following set of scores:

20, 29, 17, 28, 27, 17, 30, 23, 30, 28, 21, 17

(b) Draw the box plot for the set of scores in (a) above on the grid below.



End of Part A