Name: ..... Maths Class: .....

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 10 YEARLY EXAMINATION

Mathematics

OCTOBER 2011

TIME ALLOWED: 70 minutes

Instructions:

- Write your name and class at the top of this page, **and on the front page of your answer booklet**
- All necessary working must be shown. Marks may not be awarded for careless or badly arranged work.
- Calculators may be used
- ALL questions are worth 12 marks, and part marks are shown.

(FOR MARKERS USE ONLY)

Q1	Q2	Q3	Q4	Q5	TOTAL
/12	/12	/12	/12	/12	/60

QUESTION 1: (12 Marks)

Marks

(a) Fully factorise $x^2 - 25$ **1**

(b) Find the fraction halfway between $\frac{2}{3}$ and $\frac{3}{4}$ **1**

(c) The marks for all students in a test in Aaron's maths class have a mean of 52 and a standard deviation of 5.25. Aaron does his test late, and gains a mark of 54. **2**

Indicate whether the following get higher, lower or remain the same.

(i) THE MEAN

(ii) THE STANDARD DEVIATION

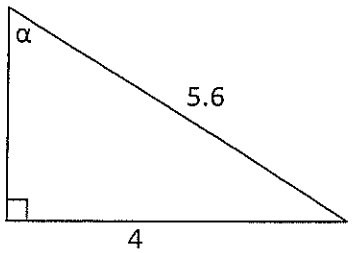
(d) Solve the following pair of simultaneous equations: **3**

$$3x - 4y = 10$$
$$y = 2x - 5$$

(e) Simplify $\frac{3x-1}{2} - \frac{5+6x}{4}$ **2**

(f) Find the value of $cos112^o15'$ to 1 decimal place. **1**

(g) Find the size of the angle marked α, to the nearest minute: **2**



QUESTION 2: (12 Marks) Start a new page

Marks

(a) Peter works for an hourly wage of $42 over a 38 hour week. After this, he is employed at a rate of time and a half for all extra hours. This week he worked 42 hours. How much did he earn for the week? **2**

(b) Bert takes out a loan of $50 000 and repays it over 10 years with monthly instalments of $750.

(i) How much interest has he paid at the end of his repayments? **1**

(ii) Express this interest as simple interest per annum. **2**

(c) Solve $(x-1)^2 = 3$, leaving your answer in exact form. **2**

(d) In a class of 30 boys, all boys must do a language, either French or German or both. 20 boys do French and 18 boys do German.

(i) How many boys do both languages? **1**

(ii) If a boy is chosen at random, what is the chance that he does German only (ie does not do French) **1**

(e) For the following stem and leaf plot, find

(i) the median **1**

(ii) the inter-quartile range **2**

Stem	*leaf*
2	1 1 4 5
3	2 3 6
4	5 6 7
5	2

QUESTION 3: (12 Marks) Start a new page

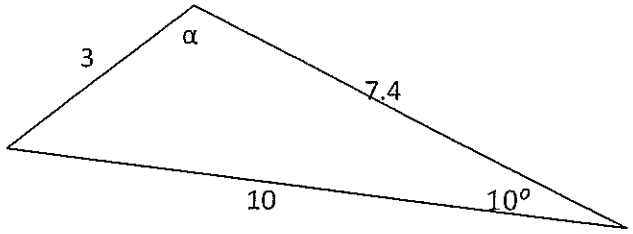
Marks

(a) Solve the following, giving your answer to 2 decimal places, if necessary **2**

$$2x^2 + 3x - 5 = 0$$

(b) In the following triangle, using the sine rule to find α gives two answers: **1**

$35^o\ 23'$ and $144^o\ 37'$



Which answer is correct? Justify your answer.

(c) For the parabola $y = x^2 - 6x + 8$

(i) Find the *y*-intercept **1**

(ii) Give the points where the curve cuts the *x*-axis **2**

(iii) Find the equation of the axis of symmetry **1**

(iv) Find the coordinates of the vertex **1**

(v) Draw the parabola on your answer sheet, showing all the keypoints you have just found. **2**

(d) Solve the equation $x = 2 + \frac{8}{x}$ **2**

QUESTION 4: (12 Marks) Start a new page

Marks

(a) Copy and complete this table:

Score	*f*	*fx*	*c.f.*
22	3		
27	2		
32	6		
37	5		
42	2		
47	2		
	$\Sigma=$	$\Sigma=$	

2

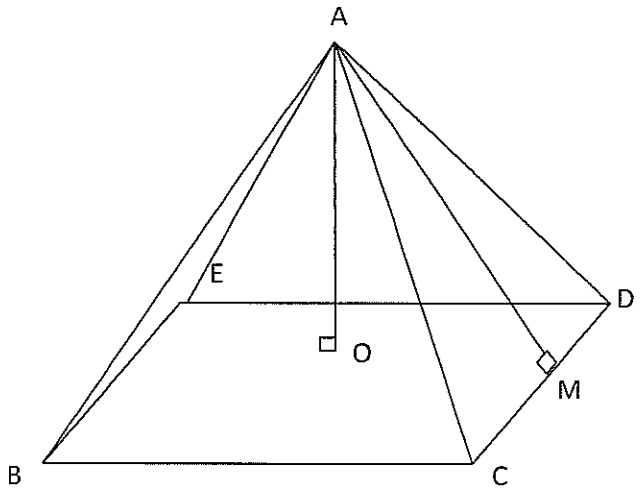
Use the table to find

(i) The mean **1**

(ii) The median **1**

(iii) The mode **1**

(b) The square pyramid below has a base of 10 cm by 10cm and perpendicular height AO of 12 cm.



(i) Find the slant height AM, correct to 1 dec place (if necessary) **1**

(ii) Find the Volume of the pyramid **1**

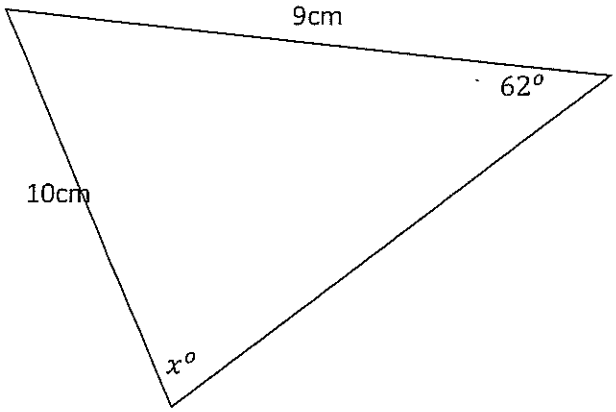
(iii) Find the Surface Area of the pyramid **2**

QUESTION 4 continues over the page....

QUESTION 4 continued.....

(c) Arthur plays a game where he throws a coin and tosses a 6-faced die. If he gets a tail and a six, he "wins". What is the chance of his "winning". **1**

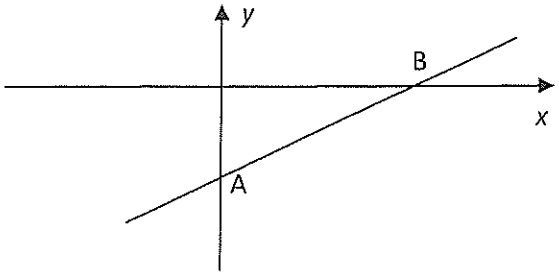
(d) Find the size of the angle marked x^o to the nearest degree, in the following: **2**



QUESTION 5: (12 Marks) Start a new page

Marks

(a) The diagram below shows the line $3x - 4y = 12$



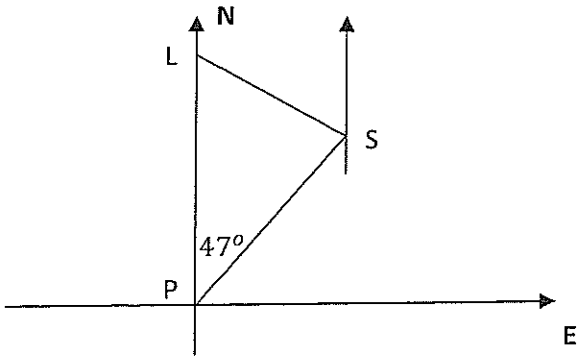
(i) Give the co-ordinates of A and B , the points where the line cuts the axes. **2**

(ii) Find the coordinates of M, the midpoint of the line A B **1**

(iii) Find the slope of the line AB **1**

(iv) Find the equation of the perpendicular bisector of the interval AB. **2**

(b) A ship leaves a port P and travels on a bearing of $N47^o\ E$ for a distance of 30 km until it is at S.



At **S** it sights a lighthouse **L**, bearing $N55^o\ W$ from its present position, and it is known that the lighthouse is due north of **P**.

(i) Redraw the diagram above on your answer page and complete all of the missing details and find tthe size of the angle PLS. **1**

(ii) How far north of **P** is **L** in a straight line? (to the nearest km) **2**

QUESTION 5 continues over the page....

QUESTION 5 cont....

(c) In James' English and Maths classes, the mean and standard deviation for all students in the class for their yearly examination are given as below:

	Mean	Standard deviation
ENGLISH	80	10.3
MATHEMATICS	68	3.1

(i) Which subject had the greatest spread of scores? **1**

(ii) James scored 82 in English and 75 in Mathematics. His mother was very unhappy with his Maths mark and gave James a hard time. James tried to explain to his mother why his Maths result was actually better than his English. In a few sentences, write a good argument for James to use to convince his mother. **2**

END OF PAPER