



TRINITY GRAMMAR SCHOOL  
MATHEMATICS DEPARTMENT



# MATHEMATICS

ADVANCED COURSE

Year 10 Assessment Task 4 (Weighting 40%)  
Yearly Examination

Tuesday 31<sup>st</sup> August 2004 (12:15 pm to 2:15 pm)

Time Allowed:  
Part A: 30 minutes  
Part B: 90 minutes

## **PART A: NON-CALCULATOR**

Total number of marks = 20

### INSTRUCTIONS TO CANDIDATES:

- Write your name and teacher above.
- Do not open this test paper until instructed to do so.
- Calculators must NOT be used in this part of the examination.
- Marks will be awarded for correct answers only.
- Part A will be collected after 30 minutes and you will then be able to start work on Part B.
- Section A: There are 20 questions each worth 1 mark. Answer all questions on the sheet provided.
- Section B: There are 10 questions each worth 8 marks. Answer all questions in the spaces provided.

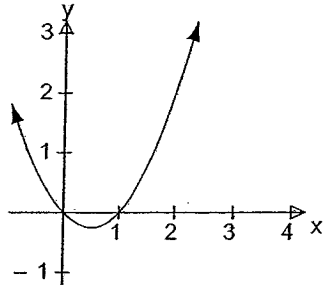
Section A Non-Calculator Section

Time allowed: 30 minutes.

Answer each question in the space provided. 20 questions worth 1 mark each.

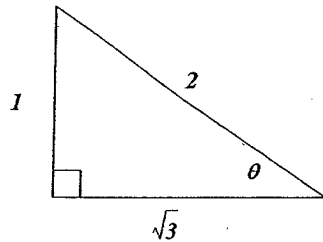
	Question	Answer
1.	Write down a fraction that lies between 2 and $2\frac{1}{2}$	
2.	Write $0.\dot{6}$ as a fraction	
3.	Evaluate $1.9 \times 0.04$	
4.	State which of the following set of numbers are irrational numbers: $\{1, \sqrt{2}, 2, 3, \pi, 4\}$	
5.	A coat costs \$220 including 10% GST. Find the amount of GST included in the price.	
6.	Expand $(x-1)^2$	
7.	If $p = -2$ and $q = \frac{1}{4}$ find the value of $p^3 - q^2$	
8.	Solve for $x$ : $1 = 7 - 3(1-x)$	
9.	Factorise completely $m^2 - 8m + 15$	
10.	Make $a$ the subject of the formula: $v = u + at$	

11.



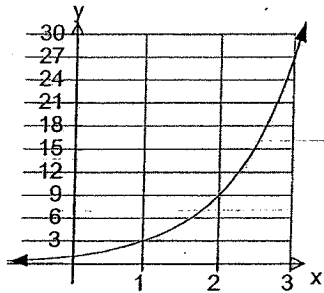
The diagram above shows a parabola whose equation can be written in the form:  $y = x(x - k)$ . Find the value of  $k$ .

12.



Use the triangle drawn above to write down the exact value of  $\cos \theta$ .

13.

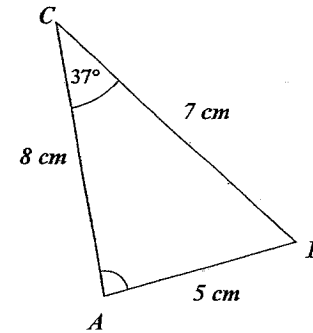


The diagram above shows a function of the form  $y = a^x$ . Find the value of  $a$ .

14.

Find the coordinates of the vertex of the parabola  $y = x^2 - 4x - 12$ .

15.



Using the Sine Rule, write down **but do not solve**, an equation you would use to calculate the value of  $\angle BAC$ .

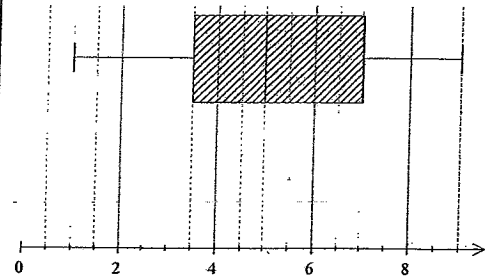
16.

Find the probability of drawing a black jack from a pack of 52 regular playing cards.

17.

The value of one internal angle of a regular polygon is  $144^\circ$ . How many sides does this polygon have?

18.



Find the inter-quartile range of the data shown in the the box-and-whisker plot drawn above.

19.

Solve for  $x$

$$2^x = \frac{1}{16}$$

20.

If  $f(x) = 2x^2 - x + 1$  find the value of  $f(-1)$



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 MATHEMATICS DEPARTMENT



# MATHEMATICS

ADVANCED COURSE

Year 10 Assessment Task 4 (Weighting 40%)  
 Yearly Examination

Tuesday 31<sup>st</sup> August 2004 (12:15 pm to 2:15 pm)

Time Allowed:  
 Part A: 30 minutes  
 Part B: 90 minutes

## PART B

Total number of marks = 80

### INSTRUCTIONS TO CANDIDATES:

- Write your name and teacher above.
- Do not open this test paper until instructed to do so.
- Show all necessary working. Marks may be deducted for careless or badly arranged work.
- Only approved calculators may be used.
- Section A: There are 20 questions each worth 1 mark. Answer all questions on the sheet provided.
- Section B: There are 10 questions each worth 8 marks. Answer all questions in the spaces provided.

### Section B

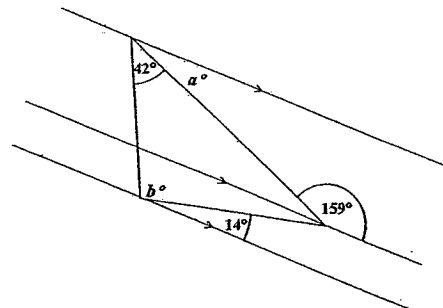
Time allowed: 1½ hours.

You may use an approved calculator in this section.  
 There are 10 questions worth 8 marks each.

#### Question 26 (Geometry)

(a)

4



Find the values of  $a$  and  $b$ , giving reasons.

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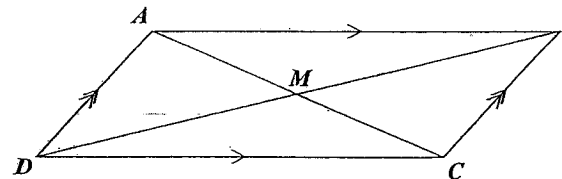
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(b)

3



$ABCD$  is a parallelogram with  $M$  the intersection of its diagonals.

(i) Prove that  $\triangle AMD \cong \triangle CMB$

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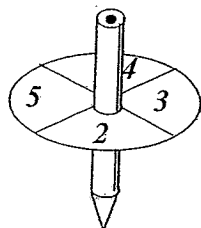
(ii) Hence, or otherwise, state why  $AM = CM$

1

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Question 27 (Chance)

- (a) The spinner shown on the right is used in a game. The numbers 2, 3, 4 and 5 are the numbers on the spinner and each has an equal chance of being selected. Bill and Bob play a game in which each player spins the spinner twice and the sum of the two numbers is the player's score for his turn.
- (i) Complete the table below to show the sample space.



		First Spin			
		4	5	6	7
Second Spin	4				
	5				
	6				
	7				

2

- (ii) Find the probability that Bill scores an even number on his first turn. 1
- 
- (iii) In fact, Bill scores 7 on his first turn. Find the probability that Bob scores a higher score than Bill on his first turn. 1
- 

- (b) Three schools enter some of their students in the Australian Maths Competition. Their results are summarised in the table below.

School	Result			Totals
	Distinction	Credit	Participation	
A	3	27	10	40
B	10	15	5	30
C	15	50	15	80
Totals	28	92	30	150

If one of these students is chosen at random, find

- (i) The probability that the student came from school A. 1
- 
- (ii) The probability that the student gained a participation result. 1
- 
- (iii) The probability that the student gained a credit, given that the student came from school B. 2
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Question 28 (Quadratics)

- (a) Solve for  $a$  by factorisation  $a^2 - 12a + 27 = 0$  2

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- (b) Solve for  $m$ , leaving your answer in surd form  $3m^2 - 9m + 2 = 0$  3

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- (c) The number of diagonals of an  $n$ -sided polygon is given by the formula

$$D = \frac{n(n-3)}{2} \quad 3$$

A polygon has 90 diagonals. Write down and solve a quadratic equation to calculate the number of sides this polygon has.

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Question 29 (Statistics)

- (a) Find the mean and standard deviation of 23, 24, 25, 26, 27, 28, 29, 30 2

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- (b) The table below shows the mean and standard deviation of marks (out of 100) in two examinations. Jonah scores 79% in both examinations. State in which examination was his better performance and justify your answer with reference to the statistics. 2

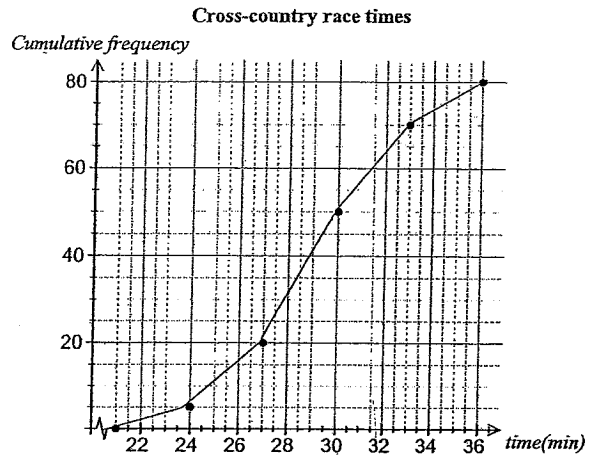
Exam	Mean	Standard Deviation
English	72	6
Maths	70	10

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- (c) The following ogive (cumulative frequency graph) displays the performance of 80 competitors in a cross-country race. Use the graph to estimate, to the nearest half-minute



- (i) the median

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- (ii) the interquartile range

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(d)

Girls	English Test Scores					
7	x	5	3	3	5	7
8	8	6	1	0	4	5
9	9	8	0	9		

The stem-and-leaf plot shown above gives the marks scored in a English Test out of 50 marks. If  $\bar{x} = 20$  for the girls' mark data, find the value of  $x$ .

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**Question 30 (Graphs)**

- (a) For the parabola  $y = 2x^2 + 5x - 3$  find

- (i) the  $y$ -intercept

1

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- (ii) the  $x$ -intercepts

2

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- (iii) the axis of symmetry

1

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- (iv) the coordinates of the vertex

1

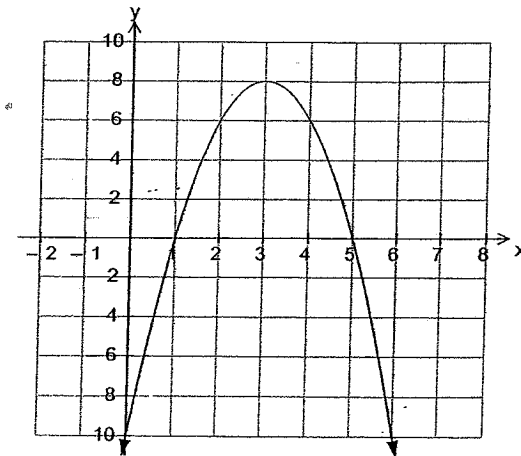
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- (b) Find the equation of the quadratic given its graph is

3




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Question 31 (Trigonometry)

(a) Write down the exact value of  $\sin 60^\circ$

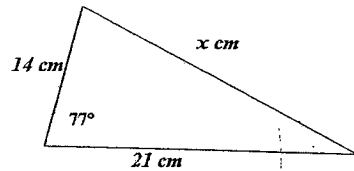
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(b) If  $\sin \alpha = \frac{3}{5}$ , find all possible values of  $\alpha$ , giving your answer to the nearest degree.

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(c) Use the Cosine Rule to find the value of  $x$  in the triangle below to one decimal place:

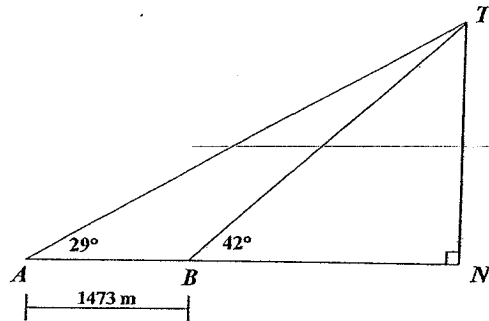


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(d)



The angles of elevation to the top ( $T$ ) of a mountain are measured from two beacons and B at sea. If the beacons are 1473 m apart, how high is the mountain,  $TN$ ?

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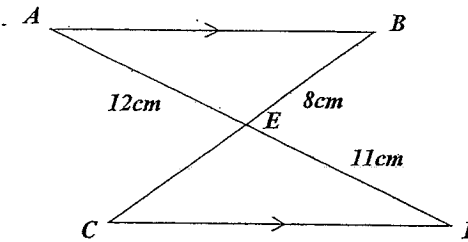
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Question 32 (Similarity)

(a)



Using the diagram above, prove that  $\triangle AEB \sim \triangle DEC$

3

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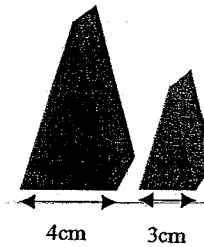
(b) Hence or otherwise, find the length  $CE$

2

\_\_\_\_\_

\_\_\_\_\_

(c)



The ratio of the length of the base of the two similar prisms shown above is 4:3 and the volume of the larger prism is  $128 \text{ cm}^3$ . Find the volume of the smaller prism.

2

\_\_\_\_\_

\_\_\_\_\_

(d) The ratio of the surface area of two similar figures is  $m:n$ . Write down an expression for the ratio of the lengths of two figures.

1

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Question 33 (Further Algebra)

(a)

- (i) If  $a$  is inversely proportional to  $b^2$ , and  $a = 8$  when  $b = \frac{1}{2}$ , find an equation that relates  $a$  to  $b$ .

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- (ii) Find the value of  $b$  when  $a = 32$ .

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(b)

Make  $c$  the subject of the formula  $E = \frac{1}{2}mc^2$

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(c)

Use the substitution  $x = p - 1$  to solve the equation  $(p - 1)^2 + 9(p - 1) + 14$

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Question 34 (Functions and Logarithms)

(a)

- (i) If  $f(x) = 3x - 1$  write down the equation of the inverse function  $f^{-1}(x)$ .

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- (ii) If  $f(x) = x^2 - x + 1$ , write down and simplify the expression for  $f(x + h) - f(x)$ .

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(b)

- (i) Evaluate  $\log_5 125$

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- (ii) Find the relationship between  $p$  and  $q$  (without logs) if

$$2\log_a p = \log_a 2 - \log_a q$$

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(c)

- Solve the equation  $2^{x-1} = 7$ , giving your answer to 2 decimal places

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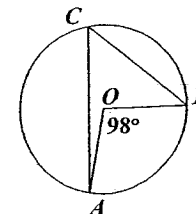
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Question 35 (Further Geometry)

- (a) Find the value of  $\angle ACB$  in the diagram below, giving reasons for your answer.




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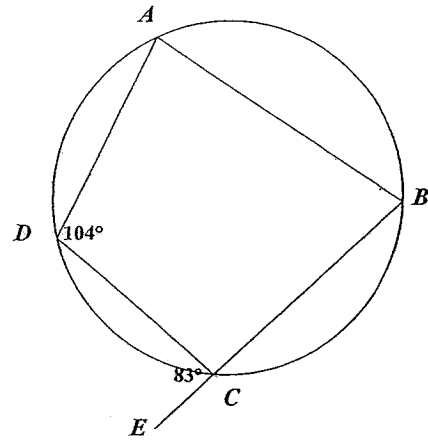


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(b)



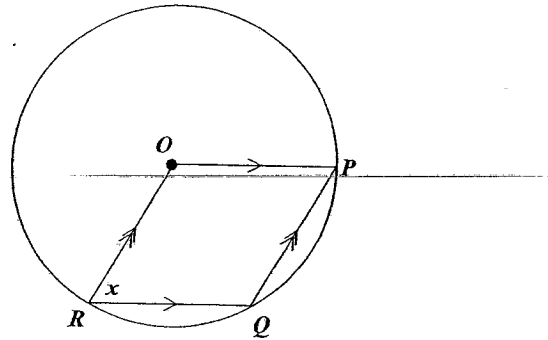
In the diagram above,  $ABCD$  is a cyclic quadrilateral. Find the value of  $\angle DAB$  and  $\angle ABC$  giving full reasoning.

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(c)



In the diagram above,  $OPQR$  is a rhombus and  $O$  is the centre of the circle. Find the value of  $x$ , giving full reasoning.

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# YEAR 10 MATHS ADVANCED Section A

## TASK 6 YEARLY

20

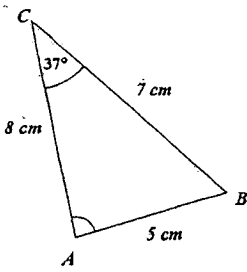
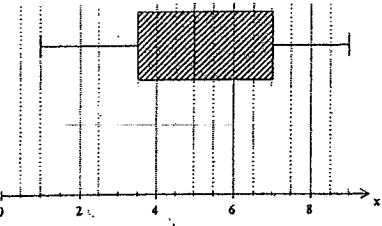
Section A (Non-Calculator Section)

Time allowed: 30 minutes.

Answer each question in the space provided. 20 questions worth 1 mark each.

Question	Answer
1. Write down a fraction that lies between 2 and $2\frac{1}{2}$	e.g. $2\frac{1}{4}$
2. Write 0.6 as a fraction	$\frac{2}{3}$
3. Evaluate $1.9 \times 0.04$	0.076
4. State which of the following set of numbers are irrational numbers: $\{1, \sqrt{2}, 2, 3, \pi, 4\}$	$\sqrt{2}$ and $\pi$
5. A coat costs \$220 including 10% GST. Find the amount of GST included in the price.	\$20
6. Expand $(x-1)^2$	$x^2 - 2x + 1$
7. If $p = -2$ and $q = \frac{1}{4}$ find the value of $p^2 - q^2$	$-8\frac{1}{16}$
8. Solve for $x$ : $1 = 7 - 3(1 - x)$	$x = -1$
9. Factorise completely $m^2 - 8m + 15$	$(m - 5)(m - 3)$
10. Make $a$ the subject of the formula: $v = u + at$	$a = \frac{v - u}{t}$

11.	<p>The diagram above shows a parabola whose equation can be written in the form: <math>y = x(x - k)</math> Find the value of <math>k</math>.</p>	$k = 1$
12.	<p>Use the triangle drawn above to write down the exact value of <math>\cos \theta</math>.</p>	$\cos \theta = \frac{\sqrt{3}}{2}$
13.	<p>The diagram above shows a function of the form <math>y = a^x</math>. Find the value of <math>a</math>.</p>	$a = 3$
14.	Find the coordinates of the vertex of the parabola $y = x^2 - 4x - 12$ .	$(2, -16)$

15.		$\frac{\sin A}{7} = \frac{\sin 37}{5}$
16.	Find the probability of drawing a black jack from a pack of 52 regular playing cards.	$\frac{1}{52} = \frac{1}{26}$ any equivalent fraction OK.
17.	The value of one internal angle of a regular polygon is $144^\circ$ . How many sides does this polygon have?	10
18.		3.5
19.	Solve for $x$ $2^x = \frac{1}{16}$	$x = -4$
20.	If $f(x) = 2x^2 - x + 1$ find the value of $f(-1)$	4

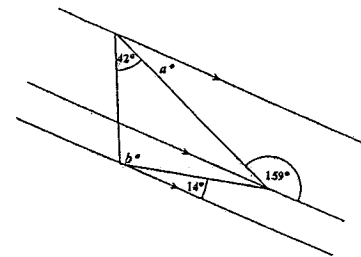
Section B

Time allowed: 1 1/2 hours.

You may use an approved calculator in this section. There are 10 questions worth 8 marks each.

Question 26 (Geometry)

(a)



1 mark for answer.  
1 mark for reason.  
x2 = 4 marks.

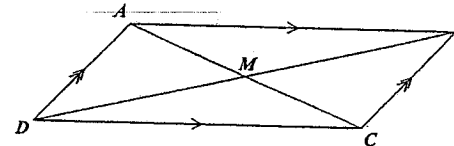
Find the values of  $a$  and  $b$ , giving reasons.

$$a = 21^\circ \text{ (co-interior } \angle\text{s)}$$

$$b = 180^\circ - (42^\circ + 14^\circ + 21^\circ) \text{ (} \angle \text{sum } \Delta)$$

$$= 103^\circ$$

(b)



1 mark per angle and reason (x2 required) + congruency test (1) = 3

ABCD is a parallelogram with  $M$  the intersection of its diagonals.  
 (i) Prove that  $\triangle AMD \cong \triangle CMB$

$$\angle AMD = \angle CMB \text{ (vert opp } \angle\text{s)}$$

$$\angle MAD = \angle MCB \text{ (alt } \angle\text{s } AD \parallel BC)$$

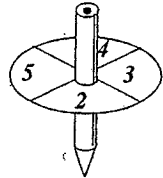
$$AD = BC \text{ (opposite sides } \parallel \text{ogram). } \therefore \triangle AMD \cong \triangle CMB \text{ (AAS)}$$

(ii) Hence, or otherwise, state why  $AM = CM$

Corresponding sides in congruent  $\Delta\text{s}$

Question 27 (Chance)

- (a) The spinner shown on the right is used in a game. The numbers 2, 3, 4 and 5 are the numbers on the spinner and each has an equal chance of being selected. Bill and Bob play a game in which each player spins the spinner twice and the sum of the two numbers is the player's score for his turn.
- (i) Complete the table below to show the sample space.



		First Spin			
Second Spin	4	5	6	7	
	5				
	6				
	7				

All correct = 2 marks  
-1 per error to 0

- (ii) Find the probability that Bill scores an even number on his first turn. 1
- $\frac{8}{16} = \frac{1}{2}$

- (iii) In fact, Bill scores 7 on his first turn. Find the probability that Bob scores a higher score than Bill on his first turn. 1
- $\frac{6}{16} = \frac{3}{8}$

- (b) Three schools enter some of their students in the Australian Maths Competition. Their results are summarised in the table below.

School	Result			Total
	Distinction	Credit	Participation	
A	3	27	10	40
B	10	15	5	30
C	15	50	15	80
Totals	28	92	30	150

- If one of these students is chosen at random, find
- (i) The probability that the student came from school A. 1
- $\frac{40}{150} = \frac{4}{15}$
- (ii) The probability that the student gained a participation result. 1
- $\frac{30}{150} = \frac{1}{5}$
- (iii) The probability that the student gained a credit, given that the student came from school B. 2
- 1 mark  $\Rightarrow \frac{15}{30} = \frac{1}{2}$   
1 mark  $\Rightarrow$

Question 28 (Quadratics)

- (a) Solve for  $a$  by factorisation  $a^2 - 12a + 27 = 0$
- $(a-9)(a-3) = 0$       factorisation = 1 mark  
 $\therefore a = 3 \text{ or } 9$       solution = 1 mark

- (b) Solve for  $m$ , leaving your answer in surd form  $3m^2 - 9m + 2 = 0$       FOLLOW THROUGH!
- $m = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$       formula 1 mark  
 $= \frac{9 \pm \sqrt{81 - 4(3)(2)}}{6}$       substitution 1 mark  
 $= \frac{9 \pm \sqrt{57}}{6}$       evaluation 1 mark

- (c) The number of diagonals of an  $n$ -sided polygon is given by the formula
- $D = \frac{n(n-3)}{2}$
- A polygon has 90 diagonals. Write down and solve a quadratic equation to calculate the number of sides this polygon has.
- $\frac{n(n-3)}{2} = 90$       1 MARK  
 $n^2 - 3n - 180 = 0$   
 $(n-15)(n+12) = 0$       FACTORISATION = 1 MARK  
 $\therefore n = 15$  (n ≠ 12 as it is the number of sides)  
ANSWER AND EXPLANATION = 1 MARK

Question 29 (Statistics)

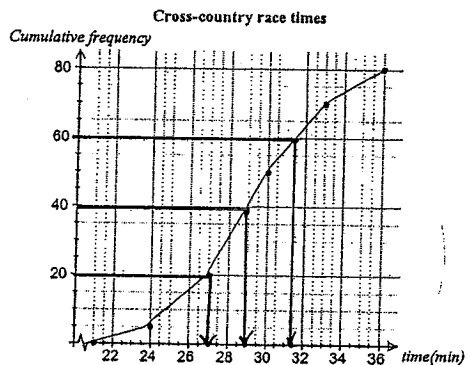
- (a) Find the mean and standard deviation of 23, 24, 25, 26, 27, 28, 29, 30
- $\bar{x} = 26.5$       ← 1 MARK  
 $\sigma = 2.29$  or  $\sigma_{n-1} = 2.45$       ← 1 MARK
- (b) The table below shows the mean and standard deviation of marks (out of 100) in two examinations. Jonah scores 70% in both examinations. State in which examination was his better performance and justify your answer with reference to the statistics. 2

Maths	72	6
PDHPE	70	10

He performed better in Maths as this mark is within one  $\sigma$  whereas his PDHPE mark is over one  $\sigma$  from  $\bar{x}$ .

1 FOR STATEMENT THAT MATHS IS BETTER  
1 FOR EXPLANATION

(c) The following ogive (cumulative frequency graph) displays the performance of 80 competitors in a cross-country race. Use the graph to estimate, to the nearest half-minute



- (i) the median 1  
 $\underline{\hspace{10em} 29 \hspace{10em}}$
- (ii) the interquartile range 1  
 $\underline{\hspace{10em} 31.5 - 27 = 4.5 \hspace{10em}}$

(d)

Girls	English Test Scores	Boys
7	5	3
8	6	1
9	8	0

The stem-and-leaf plot shown above gives the marks scored in a English Test out of 50 marks. If  $\bar{x} = 20$  for the girls' mark data, find the value of  $x$ .

$$\frac{134 + x}{8} = 20$$

METHOD = 1 MARK

$$x = 26$$

ANSWER = 1 MARK

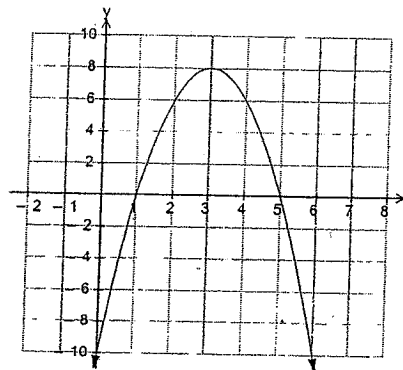
$\therefore$  missing number = 6

Question 30 (Graphs)

(a) For the parabola  $y = 2x^2 + 5x - 3$  find

- (i) the  $y$ -intercept 1  
 $\underline{\hspace{10em} y = -3 \text{ or } (0, -3) \hspace{10em}}$
- (ii) the  $x$ -intercepts 2  
 $\underline{\hspace{10em} 2x^2 + 5x - 3 = 0 \hspace{10em} \leftarrow 1 \text{ MARK}}$   
 $\underline{\hspace{10em} (2x - 1)(x + 3) = 0 \therefore x = \frac{1}{2} \text{ or } -3 \hspace{10em} \leftarrow 1 \text{ MARK}}$
- (iii) the axis of symmetry 1  
 $\underline{\hspace{10em} x = -\frac{5}{4} \hspace{10em}}$
- (iv) the coordinates of the vertex 1  
 $\underline{\hspace{10em} y = 2\left(-\frac{5}{4}\right)^2 + 5\left(-\frac{5}{4}\right) - 3 \hspace{10em}}$   
 $\underline{\hspace{10em} = -6\frac{1}{8} \hspace{10em}}$

(b) Find the equation of the quadratic given its graph is 3



$$y = a(x-1)(x-5)$$

← 1 MARK

At (0, -10)  $-10 = a(-1)(-5)$

$$a = -2$$

← 1 MARK (method)

$$\therefore y = -2(x-1)(x-5)$$

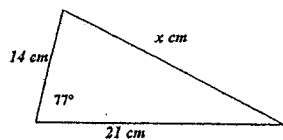
← 1 MARK

Question 31 (Trigonometry)

(a) Write down the exact value of  $\sin 60^\circ$  1  
 $\frac{\sqrt{3}}{2}$

(b) If  $\sin \alpha = \frac{3}{5}$ , find all possible values of  $\alpha$ , giving your answer to the nearest degree. 2  
 $\alpha = 37^\circ$  or  $143^\circ$

(c) Use the Cosine Rule to find the value of  $x$  in the triangle below: 2



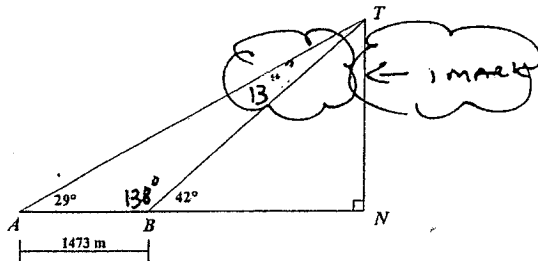
$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$x^2 = 504.72878$$

$$x = 22.5 \text{ cm (to 1 d.p.)}$$

1 MARK FOR SUBSTITUTION  
 1 MARK FOR ANSWER

(d) 3



The angles of elevation to the top of a mountain are measured from two beacons A and B at sea. If the beacons are 1473 m apart, how high is the mountain, TN?

Follow through

$$\frac{BT}{\sin 29^\circ} = \frac{1473}{\sin 15^\circ}$$

$$BT = \frac{1473 \cdot \sin 15^\circ}{\sin 29^\circ} = 3174.57756$$

1 MARK

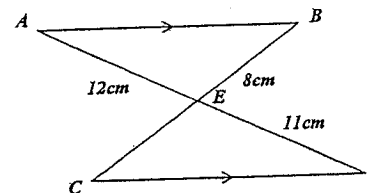
$$\sin 42^\circ = \frac{TN}{BT}$$

$$TN = 2124$$

(to nearest m) 1 MARK

Question 32 (Similarity)

(a)



Using the diagram above, prove that  $\triangle AEB \parallel \triangle DEC$

$$\angle ABE = \angle DCE \text{ (alt } \angle \text{ s } AB \parallel CD)$$

$$\angle BAE = \angle CDE \text{ (alt } \angle \text{ s } AB \parallel CD)$$

$$\angle AEB = \angle DEC \text{ (vert opp } \angle \text{ s)} \therefore \triangle AEB \parallel \triangle DEC \text{ (AAA)}$$

1 MARK  
 1 MARK

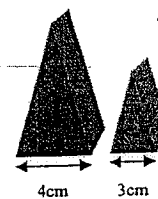
(b) Hence or otherwise, find the length CE

$$\frac{CE}{8} = \frac{11}{12}$$

$$CE = \frac{12 \cdot 11}{8} = 7\frac{1}{2} \text{ cm}$$

METHOD = 1 MARK  
 1 MARK

(c)



ANSWER = 1 MARK

The ratio of the length of the base of the two similar prisms shown above is 4:3 and the volume of the larger prism is  $128 \text{ cm}^3$ . Find the volume of the smaller prism. 2

$$\text{Volume} = 128 \times \left(\frac{3}{4}\right)^3 = 54 \text{ cm}^3$$

1 MARK  
 1 MARK

(d) The ratio of the surface area of two similar figures is  $m:n$ . Write down an expression for the ratio of the lengths of two figures. 1

$$\sqrt{m} : \sqrt{n}$$

Question 33 (Further Algebra)

- (a) (i) If  $a$  is inversely proportional to  $b^2$ , and  $a=8$  when  $b=\frac{1}{2}$ , find an equation that relates  $a$  to  $b$ . 2

MARK →  $a = \frac{k}{b^2}$  ∴  $k=2$   
 $8 = \frac{k}{\frac{1}{4}}$   $a = 2$  ← 1 MARK  
 $b^2$

- (ii) Find the value of  $b$  when  $a=32$ . 1

$32 = \frac{2}{b^2}$

$b^2 = \frac{1}{16}$  ∴  $b = \frac{1}{4}$

- (b) Make  $c$  the subject of the formula  $E = \frac{1}{2}mc^2$ . 2

$2E = mc^2$

$\frac{2E}{m} = c^2$

∴  $c = \pm \sqrt{\frac{2E}{m}}$

1 MARK METHOD

MUST HAVE ±

- (c) Use the substitution  $x=p-1$  to solve the equation  $(p-1)^2 + 9(p-1) + 14 = 0$

$x^2 + 9x + 14 = 0$  ← 1 MARK METHOD

$(x+2)(x+7) = 0$

∴  $x = -2$  or  $-7$  ∴  $p = -1$  or  $-6$

1 MARK X VALUES

1 MARK P VALUES

Question 34 (Functions and Logarithms)

- (a) (i) If  $f(x) = 3x - 1$  write down the equation of the inverse function  $f^{-1}(x)$ . 1

$f^{-1}(x) = \frac{x+1}{3}$

- (ii) If  $f(x) = x^2 - x + 1$ , write down and simplify the expression for  $f(x+h) - f(x)$ . 2

$f(x+h) - f(x) = (x+h)^2 - (x+h) + 1 - x^2 + x - 1$   
 $= x^2 + 2hx + h^2 - x - h + 1 - x^2 + x - 1$   
 $= 2hx + h^2 - h$

1 MARK ANSWER

1 MARK METHOD

- (b) (i) Evaluate  $\log_3 125$ . 3

- (ii) Find the relationship between  $p$  and  $q$  (without logs) if 2

$2 \log_2 p = \log_2 2 - \log_2 q$

$\log_2 p^2 = \log_2 \left(\frac{2}{q}\right)$  ← 1 MARK

∴  $p^2 = \frac{2}{q}$  ← 1 MARK

- (c) Solve the equation  $2^{x-1} = 7$ , giving your answer to 2 decimal places. 2

$\log_{10} 2^{(x-1)} = \log_{10} 7$  ← 1 MARK

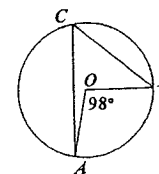
$x-1 = \frac{\log_{10} 7}{\log_{10} 2}$

$x = 3.81$

1 MARK

Question 35 (Further Geometry)

- (a) Find the value of  $\angle ACB$  in the diagram below, giving reasons for your answer. 2

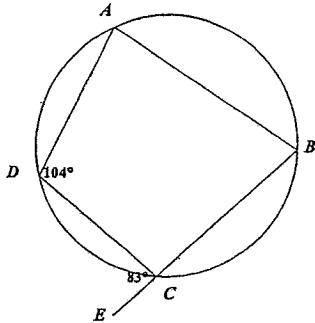


$\angle ACB = 49^\circ$  ← 1 MARK ANSWER

(∠ at centre of O is

twice that at circumference)

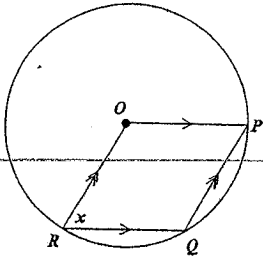
1 MARK REASON



In the diagram above,  $ABCD$  is a cyclic quadrilateral. Find the value of  $\angle DAB$  and  $\angle ABC$  giving full reasoning.

$\angle DAB = 83^\circ$  (ext  $\angle$  cyclic quad equals int opp  $\angle$ )  
 $\angle ABC = 76^\circ$  (opp  $\angle$ s cyclic quad are supplementary)

1 MARK EACH ANSWER  
+ 1 MARK REASONS



In the diagram above,  $OPQR$  is a rhombus and  $O$  is the centre of the circle. Find the value of  $x$ , giving full reasoning.

$\angle RQP = 180 - x$  (constr  $\angle$ s  $RO \parallel QP$ )  
 reflex  $\angle ROP = 2(180 - x)$  ( $\angle$  at centre of  $\odot$ )  
 obtuse  $\angle ROP = 180 - x$  (constr  $\angle$ s  $OP \parallel RQ$ )  
 $\therefore 2(180 - x) + 180 - x = 360$   
 $360 - 2x + 180 - x = 360$   
 $3x = 180$   
 $x = 60$

1 MARK PRELIMINARY METHOD

1 MARK FOR THE EQUATION OF EQUIVALENT

← 1 MARK