Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
November 2004

MATHEMATICS (SPECIFICATION A)   3301/2I
Intermediate Tier
Paper 2 Calculator

Tuesday 9 November 2004 9.00 am to 11.00 am

In addition to this paper you will require:
*   a calculator
*   mathematical instruments.

Time allowed: 2 hours

Instructions
*   Use blue or black ink or ball-point pen. Draw diagrams in pencil.
*   Fill in the boxes at the top of this page.
*   Answer **all** questions in the spaces provided.
*   Do all rough work in this booklet.
*   If your calculator does not have a π button, take the value of π to be 3.14 unless otherwise instructed in the question.

Information
*   The maximum mark for this paper is 100.
*   Mark allocations are shown in brackets.
*   Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.
*   You are expected to use a calculator where appropriate.

Advice
*   In all calculations, show clearly how you work out your answer.

AQA
ASSESSMENT and
QUALIFICATIONS
ALLIANCE

For Examiner's Use	
Pages	**Mark**
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20	
TOTAL	
Examiner's Initials	

3301/2I

Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

Area of trapezium $= \frac{1}{2}(a+b)h$
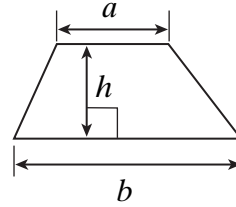
Volume of prism = area of cross-section × length
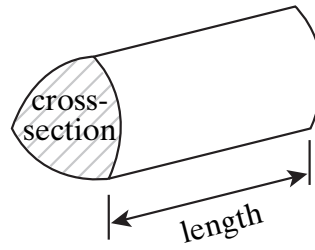
Answer **all** questions in the spaces provided.

1 (a) The holiday destinations of 30 students were recorded.

Destination	France	Spain	Italy	Greece	America
Number of students	6	9	3	7	5

Draw a clearly labelled pie chart to represent this information.

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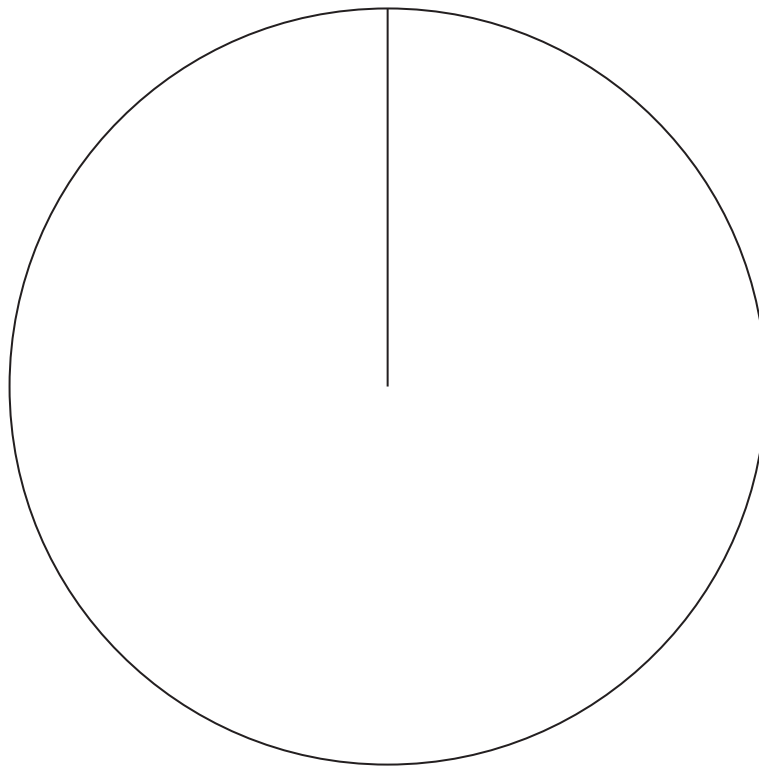
(4 marks)

(b) What percentage of the 30 students went to France for their holiday?

....

....

....

Answer .... % *(2 marks)*

Turn over ▶

2 (a) Part of a train timetable is shown.

	Departure times			
London	12.30	13.00	13.30	14.30
Peterborough	13.14	13.44	14.19	15.14
Doncaster	14.37	14.32	15.16	16.04
York	15.02	14.57	15.38	16.27
Newcastle	16.05	16.15	16.45	17.30

Asif wants to travel from Peterborough to Newcastle.
He arrives at Peterborough at 13.35 to catch the next train to Newcastle.
How long does this train take to get from Peterborough to Newcastle?
Give your answer in hours and minutes.

....

....

Answer .... hours .... minutes   *(3 marks)*

(b) The distance from London to Newcastle is 280 miles.
A train travels this distance in 3 hours 15 minutes.
Calculate the average speed of the train.

....

....

Answer .... mph   *(3 marks)*

3 The cost of a new house is made up of two parts.

Cost of land	£75 000
Building cost	£130 per square foot

A house has an area of 1700 square feet.
A builder buys the land and builds a house.
He sells it for £350 000.
How much profit is made by the builder?

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....

Answer £ ....   *(4 marks)*

TURN OVER FOR THE NEXT QUESTION

$\dfrac{}{10}$

Turn over ▶

4 The triangle *ABC* is shown on a centimetre grid.
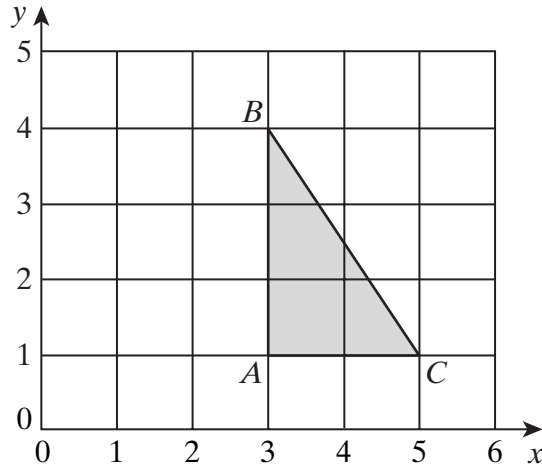
(a) Find the coordinates of the midpoint of *BC*.

....

Answer (.............................. , ...)   *(2 marks)*

(b) Find the area of the triangle *ABC*.

....

....

Answer .... cm^2 *(2 marks)*

(c) Show, on the grid below, how two triangles congruent to triangle *ABC* can be put together to form an isosceles triangle.
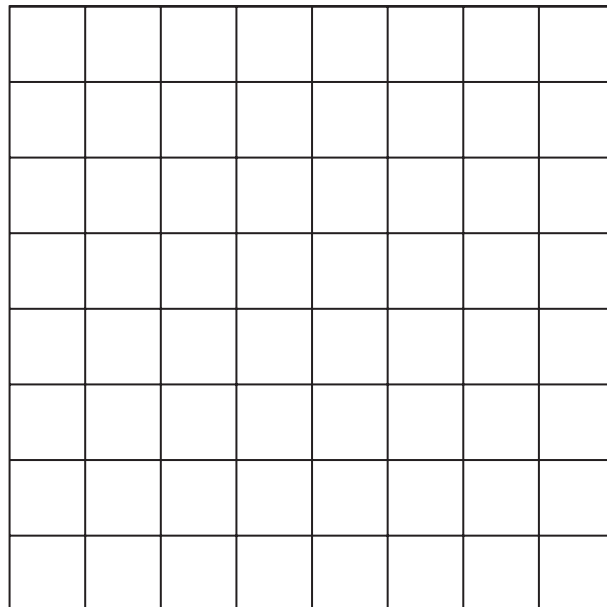
(2 marks)

5 The map of an island is shown.

North

Scale 1 cm to 5 km

North

P ✘

✘ Q
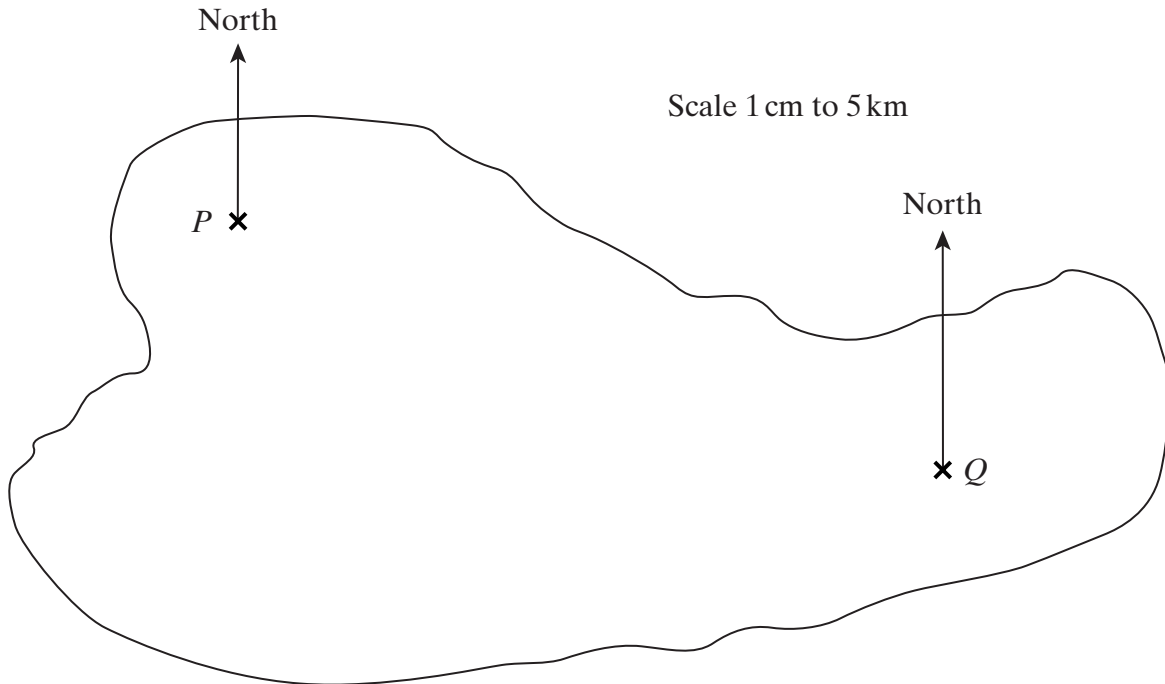
P and Q are the positions of two houses on the island.

(a) What is the bearing of P from Q?

....

Answer .... °   *(1 mark)*

(b) Calculate the actual distance from P to Q in kilometres.

....

....

Answer .... km   *(2 marks)*

(c) A house is 20 km from P on a bearing of 130°.
Mark the position of the house on the diagram with a **✘**.

....

(2 marks)

$\dfrac{}{11}$

Turn over ▶

6 (a) At a cafe a cup of coffee costs 75p.
Write down an expression for the cost, in pence, of x cups of coffee.

....

Answer .... pence   *(1 mark)*

(b) (i) The cafe sells twice as many cups of tea as it does cups of coffee.
Write down an expression for the number of cups of tea sold when x cups of coffee are sold.

....

Answer ....   *(1 mark)*

(ii) Each cup of tea costs 50p.
Write down an expression for the cost, in pence, of the cups of tea sold.

....

Answer .... pence   *(1 mark)*

(c) The cafe also sells cakes and buns.

(i) Write down an expression for the cost, in pence, of y cakes at 40p each and 3 buns at 60p each.

....

Answer .... pence   *(2 marks)*

(ii) The total cost of the y cakes and 3 buns is £4.60
Find the number of cakes sold.

....

....

....

Answer ....   *(3 marks)*

7 The *n*th term of a sequence is $3n - 1$

(a) Write down the first and second terms of the sequence.

....

....

Answer First term ....

Second term ....

(2 marks)

(b) Which term of the sequence is equal to 32?

....

....

Answer .... *(1 mark)*

(c) Explain why 85 is not a term in this sequence.

....

....

....

(2 marks)

8 Linda uses $\frac{3}{5}$ of a tin of paint to paint a fence panel.

What is the **least** number of tins she needs to paint 8 fence panels?

....

....

....

Answer .... *(3 marks)*

16

Turn over ▶

9 The scales at an airport weigh luggage to the nearest kilogram.
What are the greatest and least possible weights of a case showing 25 kg on the scale?

....

Answer   Greatest .... kg

Least .... kg

(2 marks)

10 *P* is a prime number.
Q is an odd number.
State whether each of the following is always odd or always even or could be either odd or even.

Tick the appropriate box.

(a) *P*(*Q* + 1)

....

☐   ☐   ☐

Always odd   Always even   Could be either
                                                      odd or even

(1 mark)

(b) *Q* – *P*

....

☐   ☐   ☐

Always odd   Always even   Could be either
                                                      odd or even

(1 mark)

11 A cylinder has a radius of 5 cm.

←5 cm→
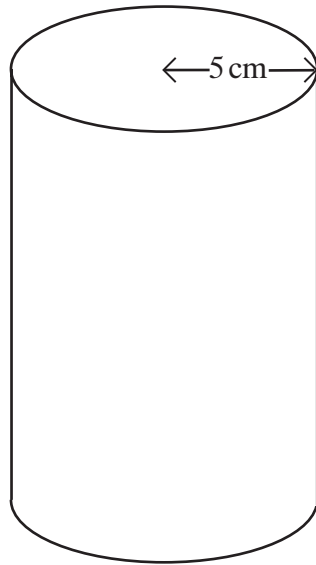
Not to scale

(a) Calculate the circumference of a circular end of the cylinder.

....

....

Answer .... cm   *(2 marks)*

(b) The cylinder has a volume of 250 cm³.
Calculate the height of the cylinder.

....

....

....

....

Answer .... cm   *(3 marks)*

12 (a) The National Curriculum levels in Mathematics for 30 students in year 9 were recorded.

Level	Number of students
3	0
4	4
5	4
6	9
7	8
8	5

Calculate the mean level.

....

....

Answer ....   *(3 marks)*

(b) The 30 students study both French and Spanish.
Their National Curriculum levels in these subjects are shown in the two-way table.

		Level in Spanish					
		1	2	3	4	5	6
Level in French	1	0	0	0	0	0	0
	2	1	0	0	0	0	0
	3	2	1	1	0	0	0
	4	0	3	4	1	0	0
	5	0	1	2	3	2	0
	6	0	0	3	3	2	1

(i) What is the median level for French?
Show clearly how you obtained your answer.

....

....

....

....

Answer ....   *(2 marks)*

(ii) The teacher claims that the students are better at French than at Spanish. How can you tell from the table that this is true?

....

....

(1 mark)

13 Solve the equations

(a) $\dfrac{20}{x} = 4$

....

....

....

Answer $x = $ .... *(2 marks)*

(b) $\dfrac{y}{3} + 5 = 9$

....

....

....

Answer $y = $ .... *(2 marks)*

(c) $4(z - 1) = 2(z + 3)$

....

....

....

Answer $z = $ .... *(3 marks)*

Turn over ▶

14 Calculate the value of

$$\frac{8.4 - 3.79}{11.62 - 15.89}$$

(a) Write down the full calculator display.

Answer .... *(1 mark)*

(b) Give your answer to three significant figures.

Answer .... *(1 mark)*

15 (a) During 2003 the average wage earned by some factory workers in Barnsley rose from £350 to £372.
What was the percentage increase?

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....

....

Answer .... % *(3 marks)*

(b) During 2003 the number of people out of work in Barnsley fell by 8%.
At the end of the year there were 2576 people out of work in Barnsley.
How many people were out of work at the beginning of the year?

....

....

....

....

Answer .... *(3 marks)*

16 A rectangular field *ABCD* is shown.
The length of the field, *AB* = 160 m.
The width of the field, *BC* = 75 m.

160 m

Not to scale

75 m

(a) Calculate the length of the diagonal *BD*.

Give your answer to a suitable degree of accuracy.

....

....

....

....

....

Answer .... m   *(4 marks)*

(b) Calculate the size of angle *ADB*.

....

....

....

....

Answer .... degrees   *(3 marks)*

Turn over ▶

17 *ABCD* is a rectangle.
 AB = 4 cm, *AD* = 3 cm and *BD* = 5 cm.
 DCE is a straight line.
 Angle *DBE* is 90°

4 cm

A

B

Not to scale

5 cm

3 cm

D

C
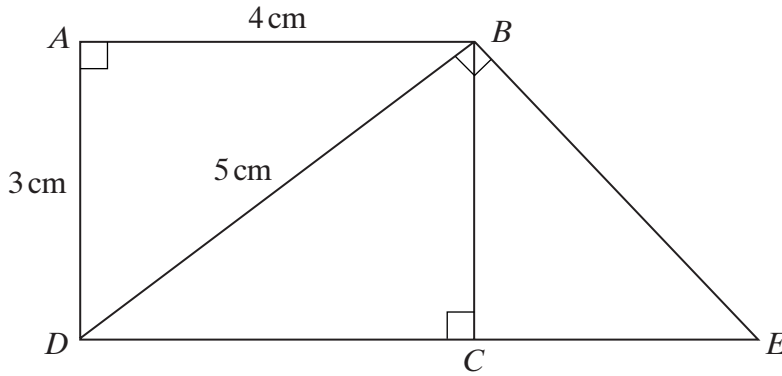
E

(a) Explain why triangles *ADB* and *BDE* are similar.

....

....

....

....

(2 marks)

(b) Find the length of *BE*.

....

....

....

....

Answer .... cm   *(2 marks)*

18 (a) Write the number 0.00756 in standard form.

....

Answer .... *(1 mark)*

(b) The Earth is approximately a sphere of radius 6400 km.
The surface area of a sphere is given by the formula $A = 4\pi r^2$.
Calculate the approximate surface area of the Earth.
Give your answer in standard form.

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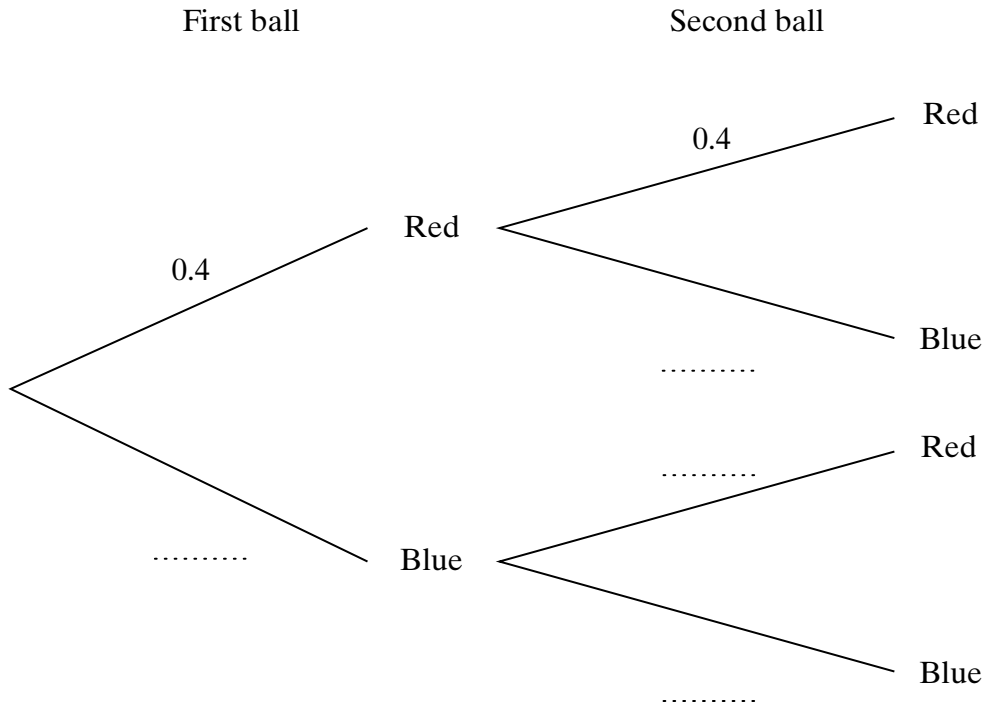
Answer .... km^2 *(3 marks)*

TURN OVER FOR THE NEXT QUESTION

19 A bag contains 4 red balls and 6 blue balls.
A ball is taken from the bag at random and replaced.
Another ball is then taken from the bag at random.

(a) Complete the tree diagram.

First ball   Second ball

                                        0.4   Red
                        Red <
                                        ....   Blue

            0.4

                                        ....   Red
                        Blue <
            ....
                                        ....   Blue

(1 mark)

(b) What is the probability that both balls are the same colour?

....

....

....

....

Answer ....   *(3 marks)*

20 (a) Find the equation of the line *AB*.

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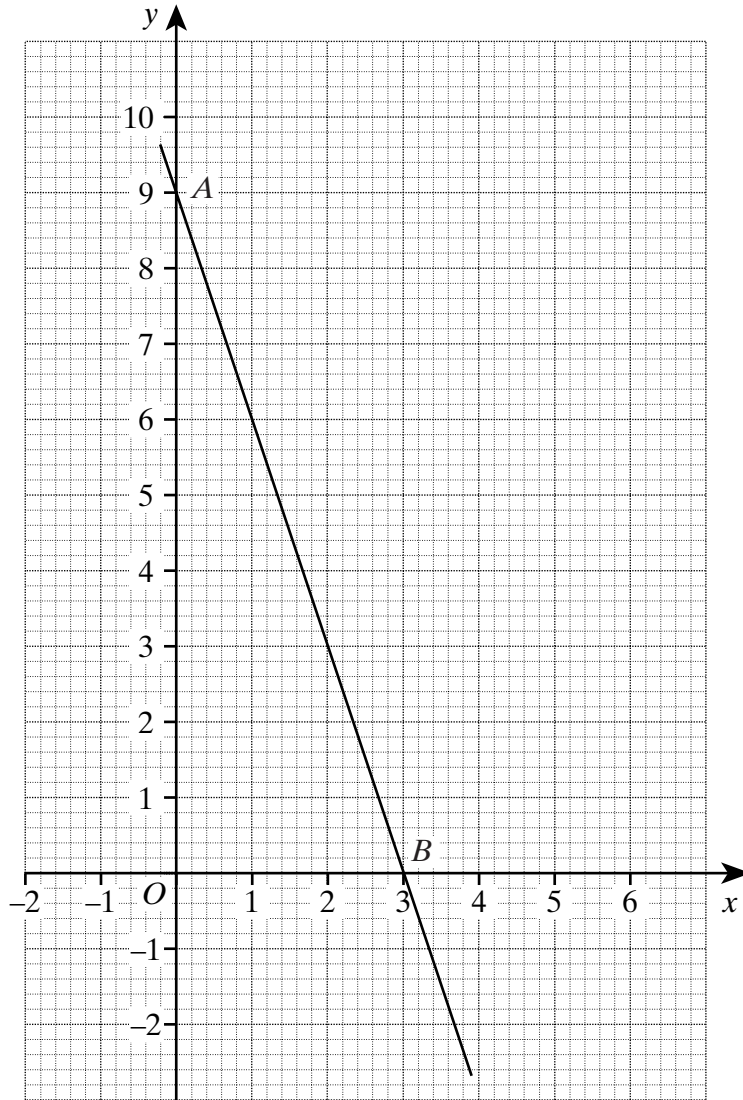
Answer .... *(3 marks)*

(b) Give the *y*-coordinate of the point on the line with an *x*-coordinate of 6.

....

....

Answer .... *(2 marks)*
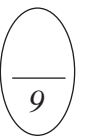
Turn over ▶

21 The total of each row is given at the side of the table.

$4x + 1$	$2(x + 5)$	20
$2x$	4	A

Find the values of x and A.

....

....

....

....

....

Answer $x =$ ....

$A =$ ....

(3 marks)

END OF QUESTIONS