

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
June 2006



MATHEMATICS (SPECIFICATION A)
Intermediate Tier
Paper 2 Calculator

3301/2I

Monday 12 June 2006 9.00 am to 11.00 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments 	
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For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
TOTAL	
Examiner's Initials	

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.
- Answer the questions in the spaces provided.
- Do all rough work in this book.

Information

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. They must be tagged securely to this answer booklet.

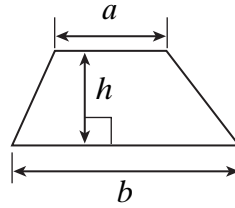
Advice

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

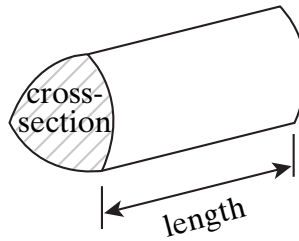
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross-section \times length



Answer **all** questions in the spaces provided.

1 (a) Calculate $\frac{4.5}{0.6^2}$

.....
.....

Answer (1 mark)

(b) Calculate 36% of £420.

.....
.....
.....

Answer £ (2 marks)

(c) What percentage is £84 of £240?

.....
.....
.....

Answer % (2 marks)

Turn over for the next question

Turn over 

2 The cost of a holiday is made up of three parts.

accommodation + insurance + travel

City break to Paris

3 nights

Total cost of £ 245

The accommodation for this holiday costs £52 each night.

The insurance costs £26.

How much does the travel cost?

.....

.....

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.....

Answer £ (4 marks)

- 3 (a) Complete the table of values for $y = 3x + 4$

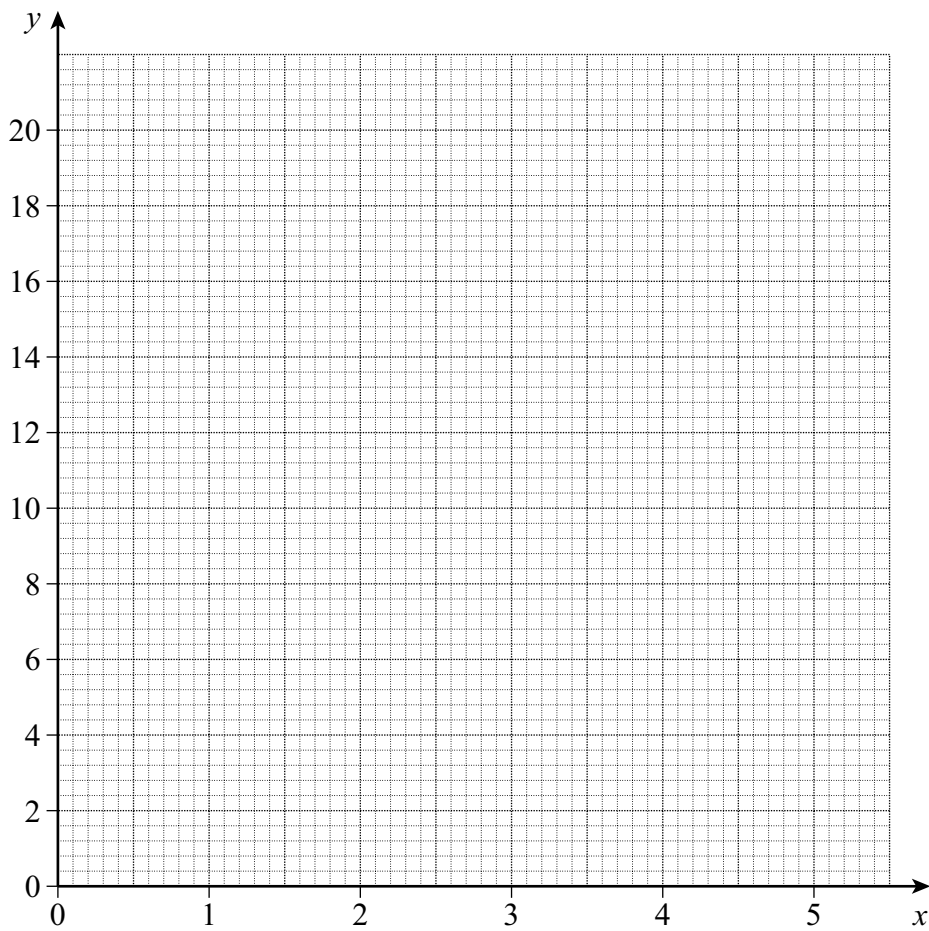
x	0	1	2	3	4	5
y	4		10		16	19

(1 mark)

.....

.....

- (b) On the grid draw the graph of $y = 3x + 4$ for values of x from 0 to 5.



(2 marks)

- (c) On the grid draw and label the line $x = 2.5$

(1 mark)

Turn over 

4 (a) Change a speed of 72 kilometres per hour into miles per hour.

.....
.....

Answer miles per hour (2 marks)

(b) A car travels 200 kilometres in 3 hours 30 minutes.
Calculate its average speed in kilometres per hour.
Give your answer to an appropriate degree of accuracy.

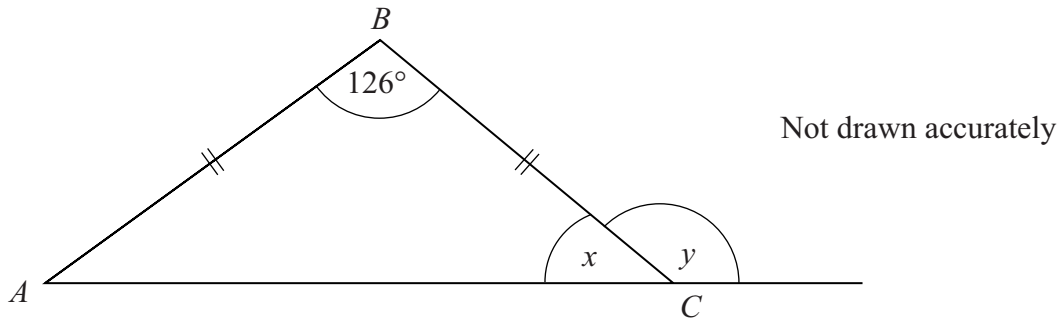
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Answer kilometres per hour (4 marks)

5 Draw a sketch of a prism with a triangular cross-section.

(2 marks)

- 6 ABC is an isosceles triangle.
 $AB = BC$



Work out the values of x and y .

.....

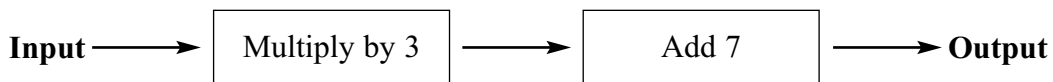
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Answer $x =$ degrees

$y =$ degrees (3 marks)

- 7 A two-stage operation is shown.



- (a) When the input is -2 what is the output?

.....

.....

Answer (1 mark)

- (b) When the input is n what is the output?

.....

Answer (2 marks)

8 A rounders coach records the number of rounders the players in her squad scored in a season. All the players scored at least once. She shows the data in a stem and leaf diagram.

Key | 2 | 7 represents 27 rounders scored

0	1	1	2	7
1	2	5	5	
2	3	7		
3	6			
4	0			
5	0	9		

(a) What is the range of the data?

.....
.....

Answer (1 mark)

(b) How many players are there in the squad?

.....
.....

Answer (1 mark)

(c) What is the median number of rounders scored?

.....
.....

Answer (1 mark)

(d) Calculate the mean number of rounders scored.

.....
.....

Answer (3 marks)

9 Hassan says



When you square a positive number the answer is **always** bigger than the original number.

For example

$2.5^2 = 6.25$ and 6.25 is bigger than 2.5

Find an example to show that Hassan is wrong.
You **must** show your working.

.....
.....
.....

(2 marks)

10 The n th term of a sequence is given by the expression $n^2 - 3$
Write down the first three terms of the sequence.

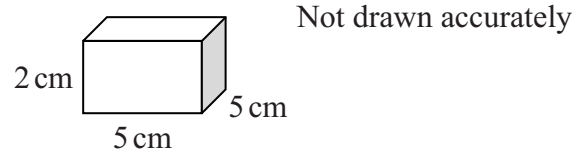
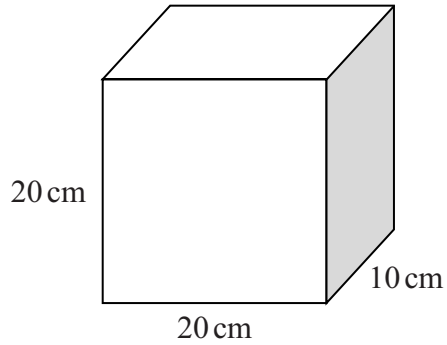
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Answer,, (2 marks)

Turn over for the next question

Turn over 

- 11** The diagram shows two boxes that are cuboids.
The larger box measures 20 cm by 10 cm by 20 cm.
It is partly filled with 70 smaller boxes each measuring 5 cm by 5 cm by 2 cm.
The smaller boxes are packed so that there are no gaps between them.



How many more smaller boxes could be fitted in the larger box?

.....

.....

.....

.....

Answer (4 marks)

12 Solve the equations

(a) $4v - 1 = 9$

.....
.....

Answer $v =$ (2 marks)

(b) $3w + 4 = 19 - 2w$

.....
.....
.....

Answer $w =$ (3 marks)

(c) $\frac{x}{5} - 2 = 11$

.....
.....
.....

Answer $x =$ (2 marks)

(d) $4(y + 3) = 9(y - 2)$

.....
.....
.....
.....
.....

Answer $y =$ (3 marks)

Turn over 

13 Solve the inequality

$$5x + 3 > 10$$

.....

.....

.....

Answer (2 marks)

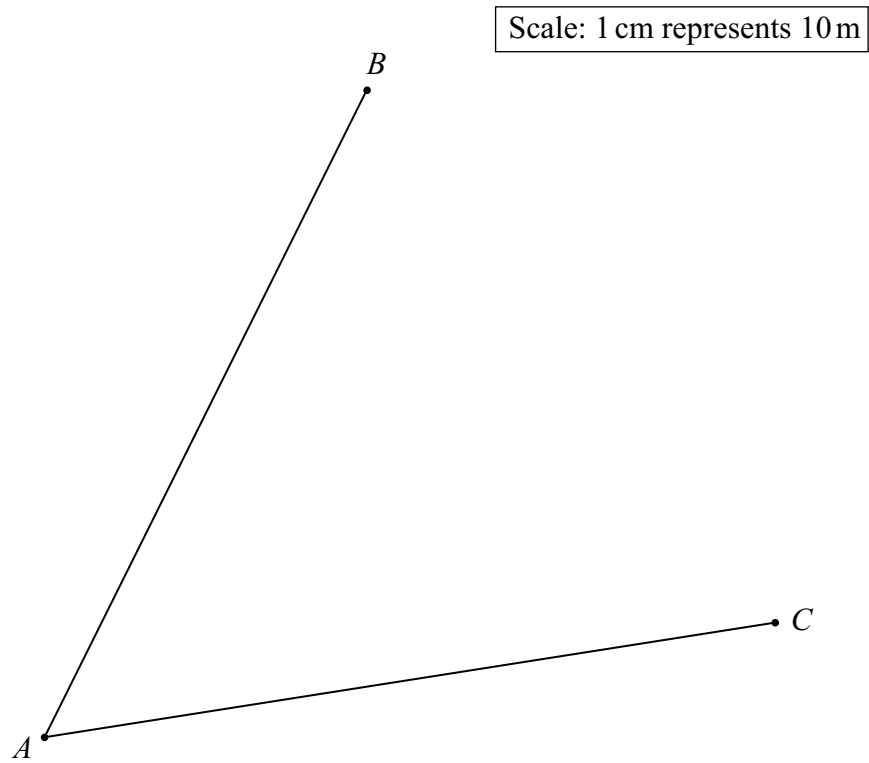
14 Use a ruler and compasses to construct a rhombus that has sides of 6 cm and whose shorter diagonal is 4 cm.

(4 marks)

- 15 AB and AC represent two walls.
A mast is to be erected that is

equidistant from AB and AC

between 40 m and 70 m from A .



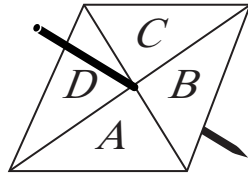
Show clearly all the possible positions of the mast.

(3 marks)

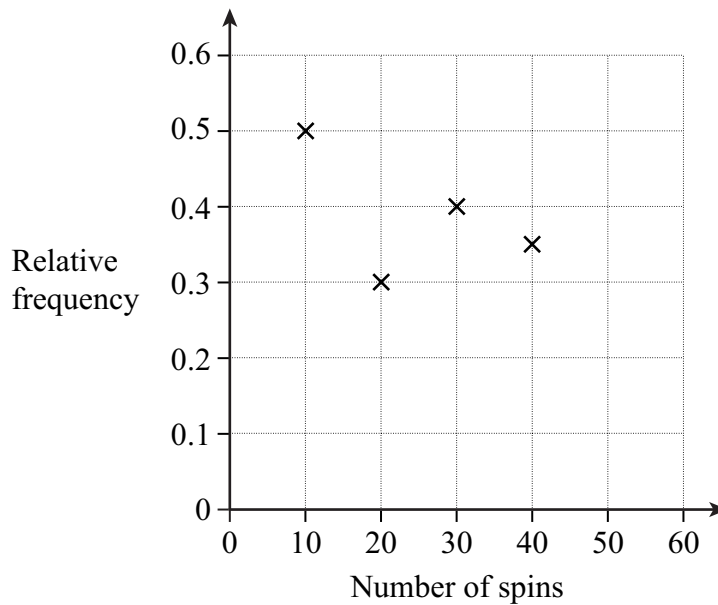
Turn over for the next question

Turn over ►

16 A four-sided spinner has sections labelled A,B,C,D.



The spinner is spun and the relative frequency of the letter A is recorded after every 10 spins.



(a) After 50 spins there were 20 letter As.
Plot this relative frequency on the diagram.

..... (1 mark)

(b) The relative frequency after the first 60 spins is 0.45
How many times does the spinner land on A in the first 60 spins?

.....
Answer (1 mark)

(c) Is the spinner biased?
Give a reason for your answer.

.....
..... (2 marks)

- (d) The spinner is spun 1000 times.
How many times would you expect the spinner to land on A?

.....

Answer (2 marks)

- (e) A different four-sided spinner has these probabilities.

Letter	A	B	C	D
Probability	0.2	0.3	0.4	0.1

What is the probability of getting a B or a C with one spin?

.....

.....

Answer (2 marks)

- 17 The labels on two types of cereal bar show the following information.

	Fat per 100g	Bar weight	Fat per bar
Fruity bar	17.4 g	62.6 g	
Sports bar	10.3 g		3.4 g

Complete the table.

You **must** show your working.

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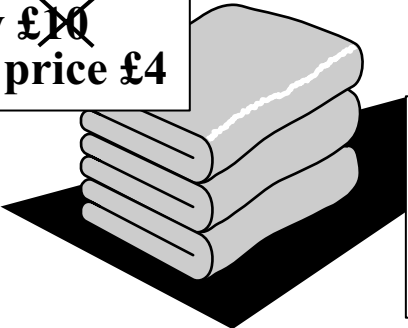
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(4 marks)

Turn over 

- 19 Jack and Jill want to buy some towels.
A store displays the following signs.



January Sales
All towels 60% off
Normally ~~£10~~
January sale price £4

Today Only
EXTRA
25% off the
January sale price

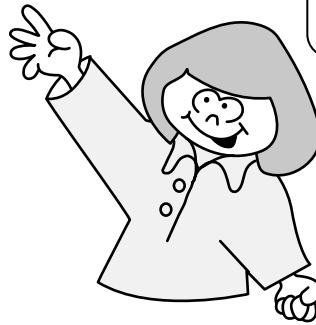
That is 85%
off the
original price

Jack



No, it is only 70%
off the
original price

Jill



Who is correct, Jack or Jill?
Explain your answer fully.

.....

.....

.....

.....

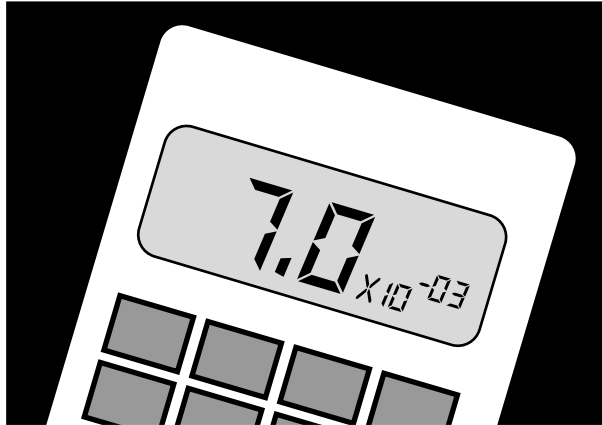
.....

.....

(2 marks)

Turn over ►

- 20 (a) A calculator displays a number in standard form as



Which of the following numbers does the display show?
Circle the correct answer.

.....

7000 0.700 0.007 700 0.0007

(1 mark)

- (b) Use your calculator to work out

$$\cos(\tan^{-1}0.45)$$

- (i) Give **all** the figures in your calculator display.

Answer (1 mark)

- (ii) Write your answer in standard form to 3 significant figures.

.....

Answer (1 mark)

- (c) Use your calculator to work out

$$\frac{(3.45 \times 10^4) \times (4.9 \times 10^{-2})}{(2.1 \times 10^5)}$$

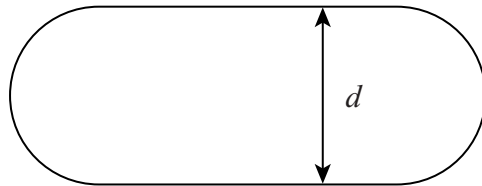
Answer (1 mark)

21 Find the equation of the line through (0, -2) and (4, 18).

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.....
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Answer (3 marks)

22 A race track is made from two straights and two semicircles.
The straights are 80 m long.
The race track has a total perimeter of 400 m.



Not drawn accurately

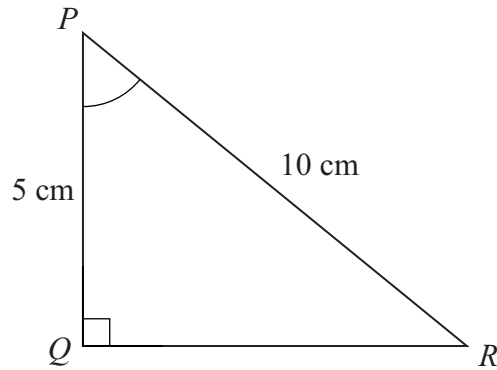
Calculate the distance, d , between the two straights.

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Answer $d =$ m (4 marks)

Turn over

- 23 PQR is a right-angled triangle.
 $PR = 10$ cm and $PQ = 5$ cm



Not drawn accurately

- (a) Calculate the length QR .

.....

Answer cm (3 marks)

- (b) Calculate the size of angle QPR .


.....

Answer degrees (3 marks)

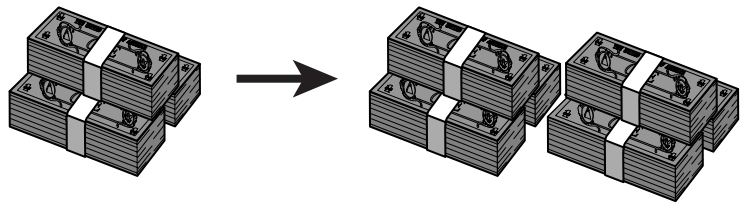
24 John has £2000 to invest.
He sees this advert.

SureFire Investments

Don't see your money
go up in smoke!



Double your money in 10 years!



The average annual growth of our investment
account is **7.2%**

Will John double his money in ten years with SureFire Investments?
You **must** show your working.

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(4 marks)

END OF QUESTIONS

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