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Total  
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**X101/102**

NATIONAL  
QUALIFICATIONS  
2003

WEDNESDAY, 21 MAY  
1.30 PM – 2.05 PM

**MATHEMATICS**  
**INTERMEDIATE 1**  
Units 1, 2 and  
Applications of Mathematics  
Paper 1  
(Non-calculator)

**Fill in these boxes and read what is printed below.**

Full name of centre

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Town

--

Forename(s)

--

Surname

--

Date of birth

Day Month Year

--	--	--	--	--	--

Scottish candidate number

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Number of seat

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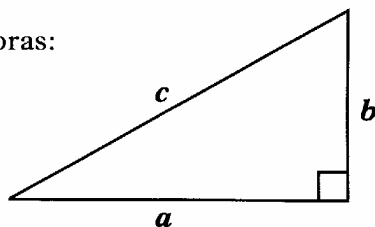
- 1 You may NOT use a calculator.**
- 2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.**
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## FORMULAE LIST

Circumference of a circle:  $C = \pi d$   
Area of a circle:  $A = \pi r^2$   
Curved surface area of a cylinder:  $A = 2\pi r h$

Theorem of Pythagoras:



$$a^2 + b^2 = c^2$$

**ALL questions should be attempted.**

*Marks*

1. (a) Find  $6 \cdot 23 - 3 \cdot 7$ .

1

(b) Find 5% of £140.

1

(c) Find  $-40 + 15$ .

1

2. A rule used to calculate the cost in pounds of electricity is:

$$\text{Cost} = 19 + (\text{number of units used} \times 0 \cdot 07)$$

Find the cost of 600 units of electricity.

2

**[Turn over**

*Marks*

3. (a) An inter-city coach left Aberdeen at 10.40 am and reached Inverness at 1.25 pm.  
How long did the journey take?

1

- (b) The average speed of the coach during the journey was 40 miles per hour.  
Find the distance between Aberdeen and Inverness.

3

Marks

4. The table below shows the **monthly payments** to be made when money is borrowed from a bank.

Borrowers can choose to make payments with or without payment protection.

<i>Amount borrowed</i>	<i>1 year</i>		<i>3 years</i>		<i>5 years</i>	
	<i>Without payment protection</i>	<i>With payment protection</i>	<i>Without payment protection</i>	<i>With payment protection</i>	<i>Without payment protection</i>	<i>With payment protection</i>
£3000	£267	£289	£100	£111	£67	£78
£5000	£435	£471	£157	£174	£102	£118
£7000	£609	£659	£220	£244	£142	£165
£10 000	£870	£942	£314	£348	£204	£236

- (a) Pete borrows £3000 over 3 years **without payment protection**.

State his monthly payment.

1

- (b) Over the 3 years, how much **extra** would Pete pay **in total** for payment protection on his loan of £3000?

2

[Turn over

*Marks*

5. Andy wants to make 150 copies of a music booklet.  
8 sheets of paper are required for each booklet.
- (a) Find the total number of sheets required.

1

Paper is sold in packets which contain 500 sheets.

- (b) How many packets of paper will Andy need to buy?

2

Marks

6. A spreadsheet is used to process data from a shop.

SALES ANALYSIS					
	A	B	C	D	E
1		Choc Bars	Crisps	Juice	Ice Cream
2	Monday	20	40	50	10
3	Tuesday	40	30	70	20
4	Wednesday	10	20	70	20
5	Thursday	40	50	80	10
6	Friday	60	60	80	10
7					
8					
9					

- (a) The result of the formula =SUM(C2..C6) is to be entered in cell C8.  
What would appear in cell C8?

1

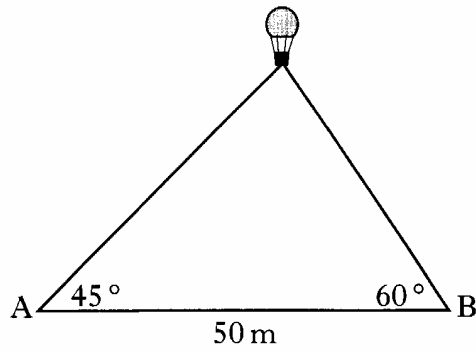
- (b) What formula would be used to enter the average daily sale of crisps in cell C9?

1

**[Turn over**

Marks

7. A hot air balloon is attached to the ground at A and B by two wires.



The distance from A to B is 50 metres.

The angle of elevation of the balloon is  $45^\circ$  from A and  $60^\circ$  from B.

- (a) Make a scale drawing to show the position of the balloon.

**Use a scale of 1 cm to 5 m.**

2

- (b) Use your scale drawing to find the actual height of the balloon.

2

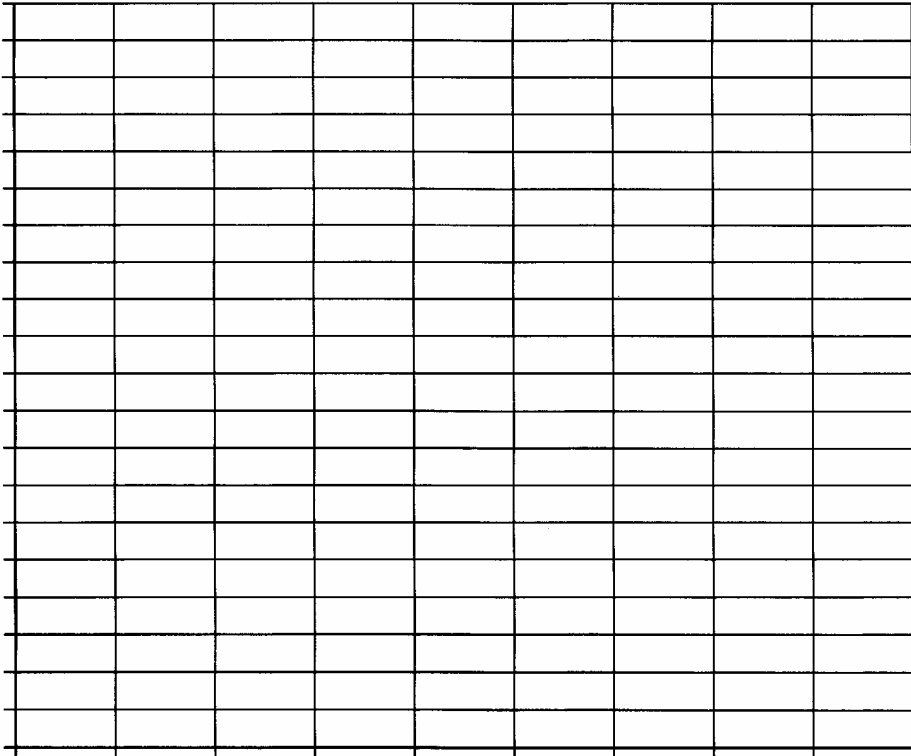


Marks

8. In a local election the number of votes for each of the four candidates is shown in the table below.

<i>Candidate</i>	<i>Votes</i>
Smith	380
Patel	240
Green	100
Jones	170

On the grid below, draw a bar graph to show this information.



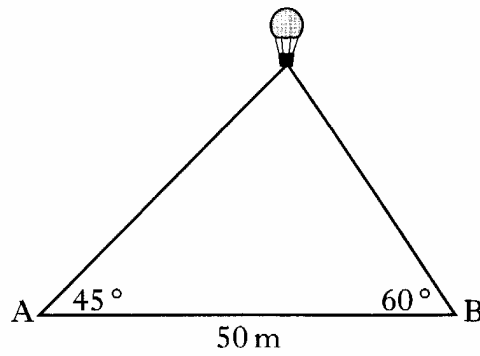
4

9. Five staff work in an office.  
Three of them are female.  
What percentage of the staff is female?

3

Marks

7. A hot air balloon is attached to the ground at A and B by two wires.



The distance from A to B is 50 metres.

The angle of elevation of the balloon is  $45^\circ$  from A and  $60^\circ$  from B.

- (a) Make a scale drawing to show the position of the balloon.

**Use a scale of 1 cm to 5 m.**

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2

Marks

10. This is a multiplication square.

8	×	5	=	40
×		×		×
10	×	-2	=	-20
=		=		=
80	×	-10	=	-800

(a) Complete this multiplication square.

3	×	-7	=	
×		×		×
-1	×	5	=	
=		=		=
	×		=	

2

10. (continued)

Marks

(b) Complete this multiplication square.

-5	×		=	
×		×		×
	×		=	-12
=		=		=
	×	-8	=	-120

3

[END OF QUESTION PAPER]

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WEDNESDAY, 21 MAY  
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**MATHEMATICS**  
**INTERMEDIATE 1**  
Units 1, 2 and  
Applications of Mathematics  
Paper 2

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Surname

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Date of birth

Day Month Year

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Scottish candidate number

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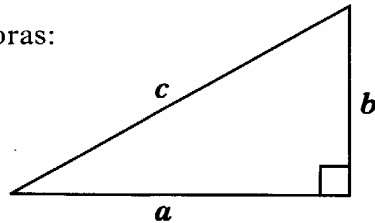
## FORMULAE LIST

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Theorem of Pythagoras:



$$a^2 + b^2 = c^2$$

Marks

**ALL questions should be attempted.**

1. A day in December is chosen at random for a youth club outing.  
Find the probability that a **Saturday** is chosen.

**DECEMBER**

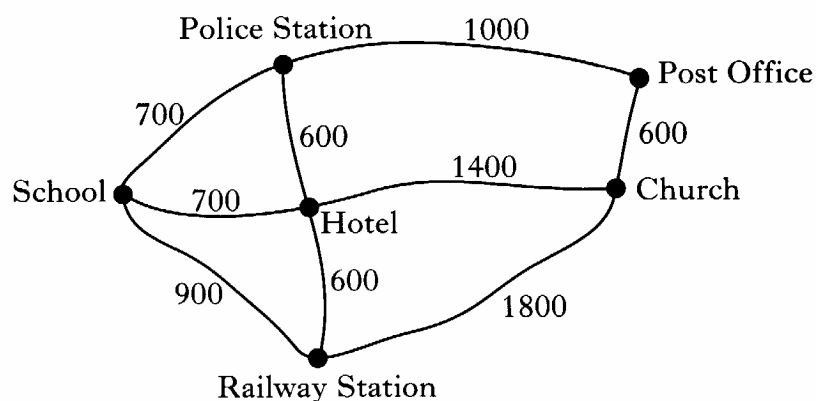
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

1

[Turn over

**Marks**

2. This network diagram shows the distances, in metres, between the **Post Office** and various buildings in a town.



- (a) State the **order** of the node at the Hotel.

1

- (b) What is the length of the shortest route from the Post Office to the Railway Station?

1



*Marks*

3. Lisa is paid £7·20 per hour for a basic 35 hour week.  
One week she works a total of 39 hours.  
Overtime worked is paid at time and a half.  
Calculate Lisa's gross pay.

4

**[Turn over**

*Marks*

4. The income of each employee in a company is shown in this frequency table.

<i>Income £</i>	<i>Frequency</i>	<i>Income × Frequency</i>
10 000	2	
12 000	3	
14 000	5	
16 000	8	
18 000	7	
	Total = 25	Total =

- (a) Write down the modal income.

1

- (b) Complete the table above and find the mean income.

3

Marks

5. A room in the Hotel Royale in Paris costs 130 euros per night.  
The exchange rate is 1.58 euros to the pound.

(a) Find the cost of the hotel room per night in pounds and pence.

3

Mr and Mrs McQueen are going to Paris.  
Their return flights cost £59 each.

(b) Find the total cost of their flights and a 3 night stay at the Hotel Royale  
in pounds and pence.

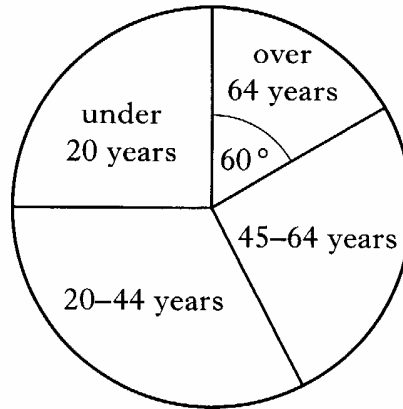
2

[Turn over

Marks

6. The population of Scotland in 2001 was 5 062 000.  
The pie chart shows the age distribution of the population in 2001.

**Age distribution  
of population  
2001**

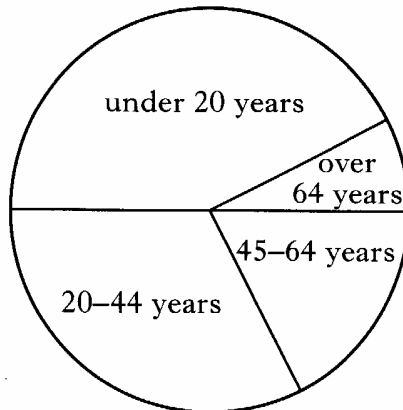


- (a) How many people were aged over 64 years?  
Give your answer to the nearest thousand.

3

- (b) The pie chart below shows the age distribution of the population of Scotland in 1901.

**Age distribution  
of population  
1901**

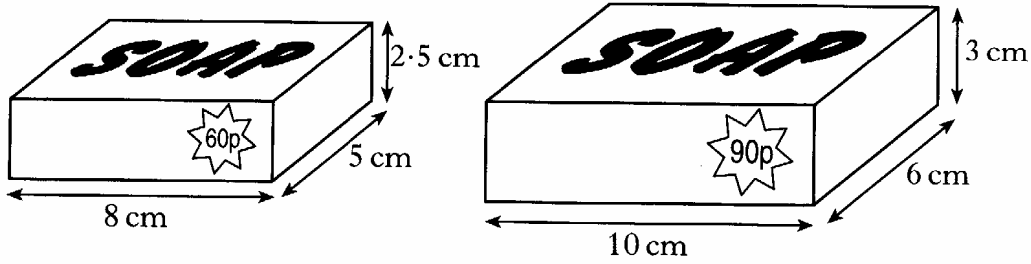


Describe the differences in the age distributions of the population of Scotland in 1901 and 2001.

2

Marks

7. The diagram below shows two bars of soap.  
Each bar is in the shape of a cuboid.



- (a) Find the volume of the smaller bar.

1

- (b) The smaller bar costs 60 pence.  
Find the cost per cubic centimetre of the smaller bar.

1

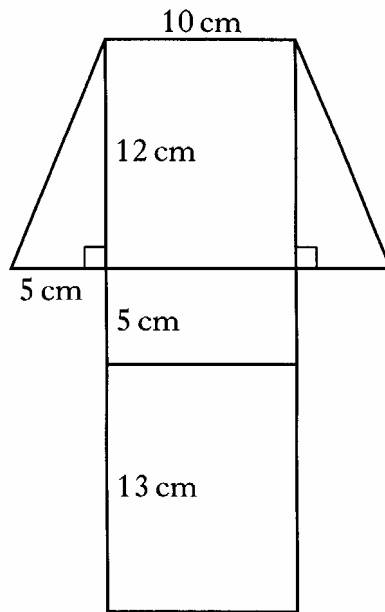
- (c) The larger bar costs 90 pence.  
Which bar of soap gives better value for money?  
**Explain clearly the reason for your answer.**

3

[Turn over

Marks

8. The diagram below shows the net of a solid shape.



(a) Name the solid shape formed from this net.

1

(b) Calculate the surface area of the solid shape.

3

Marks

10. Gail wants to insure her computer for £2400.  
The insurance company charges an annual premium of £1.25 for each £100 insured.

(a) Calculate the annual premium.

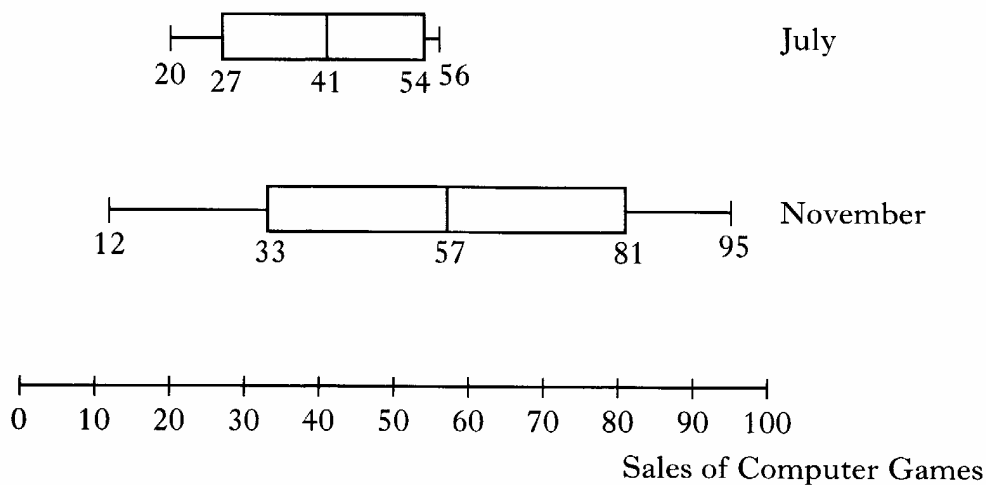
2

(b) Gail can pay her premium monthly.  
If she does this she is charged an extra 4%.  
Calculate the monthly premium.

3

Marks

11. These boxplots show the sales of computer games in a shop during the months of July and November.



- (a) Calculate the interquartile range for the November sales.

2

- (b) Explain how you can tell from the boxplots that the statement below is true.

“On average, the November sales are higher than July’s but they also tend to be more variable.”

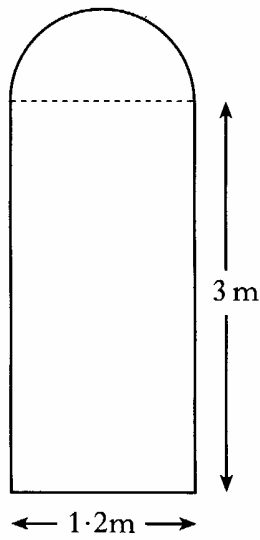
2

[Turn over for Question 12 on Page fourteen



12. The diagram below shows a window.

Marks



The window consists of a rectangle and a semi-circle.

Calculate the area of the window.

Give your answer in square metres correct to 2 decimal places.

5

[END OF QUESTION PAPER]