

FOR OFFICIAL USE

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Total  
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**X100/101**

NATIONAL  
QUALIFICATIONS  
2005

FRIDAY, 20 MAY  
1.00 PM – 1.35 PM

**MATHEMATICS**  
**INTERMEDIATE 1**  
Units 1, 2 and 3  
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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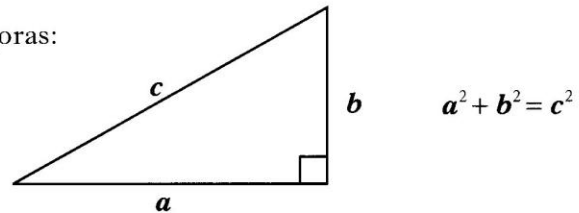
- 1 You may **NOT** use a calculator.
- 2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.
- 3 Full credit will be given only where the solution contains appropriate working.
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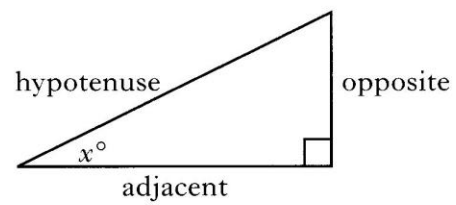
## FORMULAE LIST

Circumference of a circle:  $C = \pi d$   
Area of a circle:  $A = \pi r^2$

Theorem of Pythagoras:



Trigonometric ratios  
in a right angled  
triangle:



$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

**ALL questions should be attempted.**

*Marks*

1. (a) Find  $6 \cdot 17 - 2 \cdot 3$ .

1

(b) Find 75% of £1200.

1

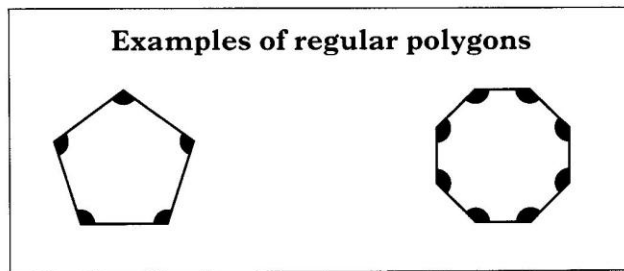
2. Joyce is going on holiday. She must be at the airport by 1.20 pm. It takes her 4 hours 30 minutes to travel from home to the airport. What is the latest time that she should leave home for the airport?

1

**[Turn over**

Marks

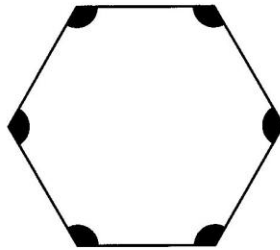
3. A regular polygon is a shape with three or more equal sides.



A rule used to calculate the size, in degrees, of each angle in a regular polygon is:

$$\text{Size of each angle} = 180 - (360 \div \text{number of sides})$$

**Calculate** the size of each angle in the regular polygon below.



**Do not measure with a protractor.**

**You must show your working.**

2

4. The number of peas counted in each of 100 pea pods is shown in this frequency table.



Marks

Peas in pod	Frequency	Peas in pod $\times$ Frequency
3	5	15
4	10	40
5	28	140
6	36	216
7	12	
8	9	
	Total = 100	Total =

Complete the table above **and** calculate the mean number of peas in a pod.

3

5. Solve algebraically the equation

$$11a - 8 = 37 + 6a.$$

3


[Turn over

Marks

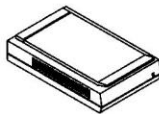
6. Anwar wants to buy some accessories for his computer.  
He sees this advert for Cathy's Computers.

### Cathy's Computers

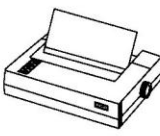
Digital Camera  
**£95**



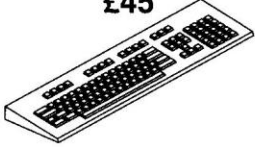
Scanner  
**£75**



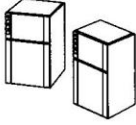
Printer  
**£70**



Cordless Keyboard  
**£45**



Pair of Speakers  
**£40**





Anwar wants to spend enough to get the free microphone.  
He can afford to spend a maximum of £200.  
He does not want to buy more than one of each accessory.

One combination of accessories that Anwar can buy is shown in the table below.

Digital Camera £95	Scanner £75	Printer £70	Cordless Keyboard £45	Pair of Speakers £40	Total Value
	✓	✓		✓	£185

Complete the table to show **all** possible combinations that Anwar can buy.

3

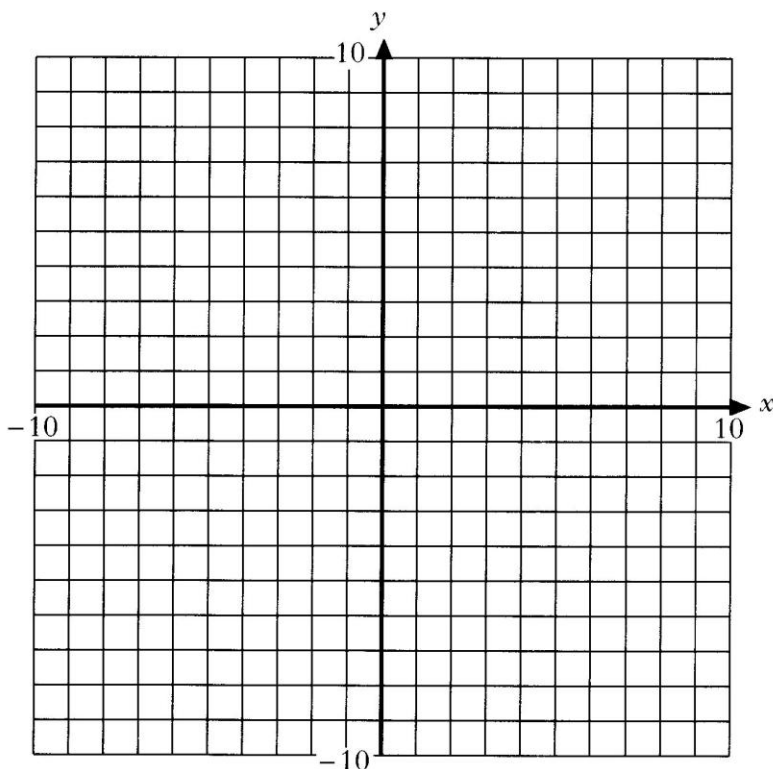
7. (a) Complete the table below for  $y = -2x + 5$ .

$x$	-2	0	4
$y$			

Marks

2

(b) Draw the line  $y = -2x + 5$  on the grid.



2

[Turn over

Marks

8. (a) While in New York, Martin changed £50 into US dollars.  
The exchange rate was £1 = \$1.62.  
How many US dollars did Martin receive for £50?

2

- (b) A few days later he received \$320 in exchange for £200.  
What was the new exchange rate?

2

9. (a) Write  $\frac{7}{1000}$  as a decimal.

1

- (b) Starting with the smallest, write the following numbers in order.

$\frac{7}{1000}$ ,      0.069,       $7.1 \times 10^{-4}$

**Show working to explain your answer.**

3



Marks

10. In a **magic square**, the numbers in each row, each column and each diagonal add up to the same **magic total**.

In this magic square the **magic total** is 3.

-2	5	0
3	1	-1
2	-3	4

(a)

-4	3	-2
1	-1	-3
0	-5	2

This is another magic square.  
What is its **magic total**?

1

- (b) Complete this **magic square**.

1		
	-2	
-3		-5

3

[END OF QUESTION PAPER]

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**INTERMEDIATE 1**  
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Surname

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Day Month Year

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Scottish candidate number

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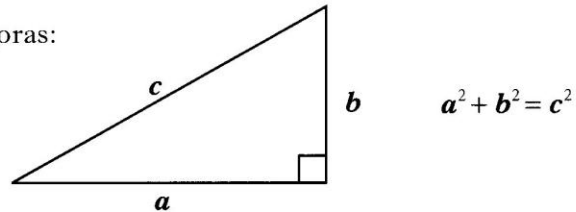
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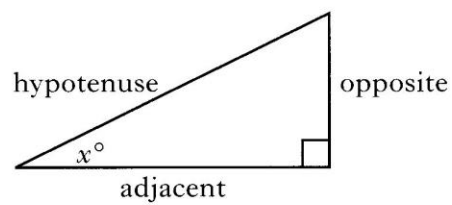
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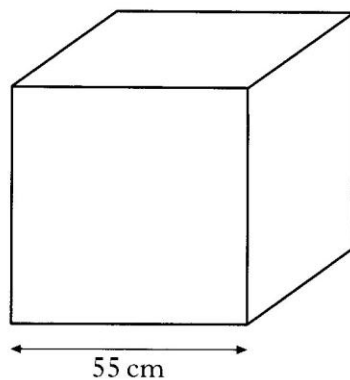
$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

**ALL questions should be attempted.**

Marks

1. Calculate the volume of the cube below.



Round your answer to the nearest thousand cubic centimetres.

2. Claire sells cars.  
She is paid £250 per month plus 3% commission on her sales.  
How much is she paid in a month when her sales are worth £72 000?

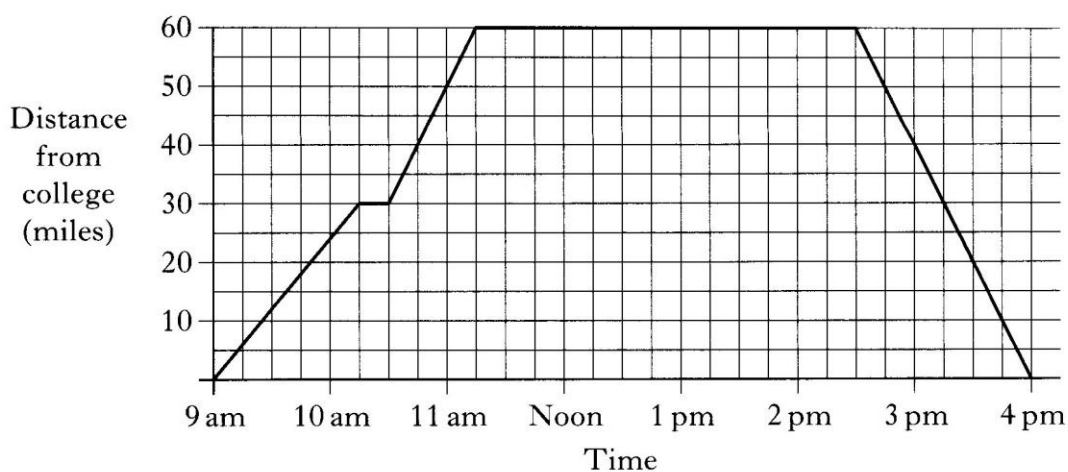
2

2

[Turn over

Marks

3. A group of students visit a theme park.  
The graph below shows their journey.  
They set off from the college at 9 am and arrive back at 4 pm.



- (a) How long did the students spend at the theme park?
- (b) Calculate the average speed, in miles per hour, of the students' return journey.

1

3

4. Solve algebraically the inequality

$$3t + 4 > 28.$$

2

Marks

5. The stem and leaf diagram below shows the ages of the players in the Kestrels rugby team.

**AGES**  
**Kestrels**

1	9
2	1 3 4 7 9
3	0 2 4 5 5 5 8 9
4	1

2 | 1 represents 21 years

- (a) What age is the oldest player?

1

- (b) Calculate the range of ages.

2

The stem and leaf diagram below shows the ages of both the Kestrels and the Falcons rugby teams.

**AGES**

<b>Falcons</b>		<b>Kestrels</b>
	9 9	1   9
8 7 7 6 3 2 1 1 0	2	2   1 3 4 7 9
8 6 4 3	3	3   0 2 4 5 5 5 8 9
	4	4   1

2 | 1 represents 21 years

- (c) Compare the ages of the two teams. Comment on any difference.

1

[Turn over

Marks

6. (a) Multiply out the brackets and simplify

$$11n + 4(7 - 2n).$$

2

- (b) Factorise  $15 + 6x.$

2

7. The scores of 12 golfers in a competition were as follows.

67	70	68	75	71	70
70	75	76	75	74	75

- (a) Find the modal score.

1

- (b) Find the median score.

2

- (c) Find the probability of choosing a golfer from this group with a score of 70.

1

Marks

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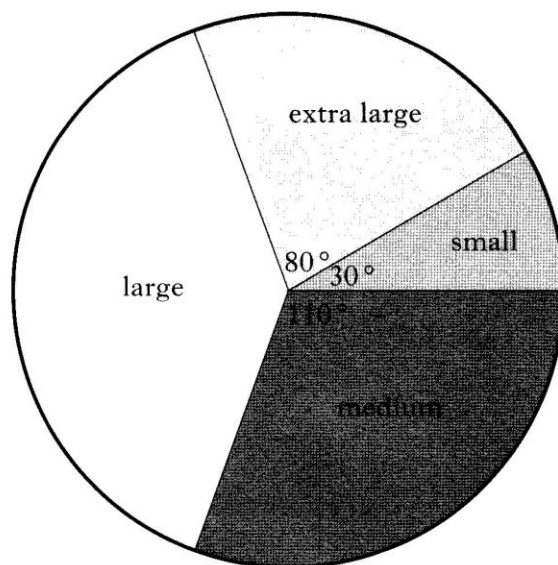


Marks

8. 60 workers in a factory voted on a new pay deal.  
42 of them voted to accept the deal.  
What percentage voted to accept the deal?

3

9. The pie chart shows the different sizes of eggs laid by a flock of hens.



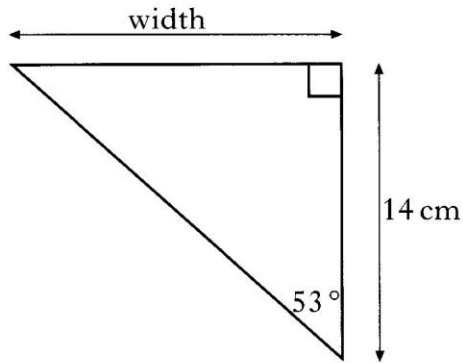
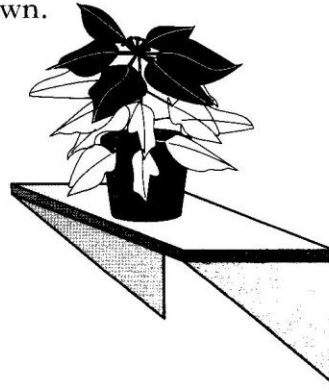
The flock of hens laid 1260 eggs.  
How many of the eggs were large?

3

[Turn over

Marks

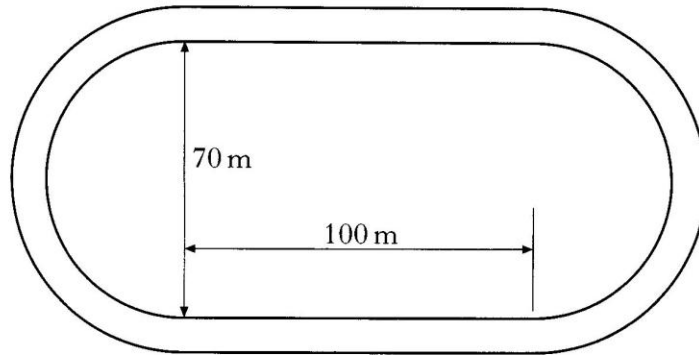
10. A rectangular shelf is supported by brackets as shown.  
Each bracket is a right angled triangle.



Calculate the width of this bracket.  
Give your answer correct to one decimal place.  
**Do not use a scale drawing.**

4

11. The diagram below shows a speedway track.



The straights are each 100 metres long.  
The bends are semi-circles as shown.  
Calculate the perimeter of the inside of the track.

Marks

4

12. Use the formula below to find the value of  $A$  when  $b = 2.4$  and  $c = 5$ .

$$A = 3bc^2$$

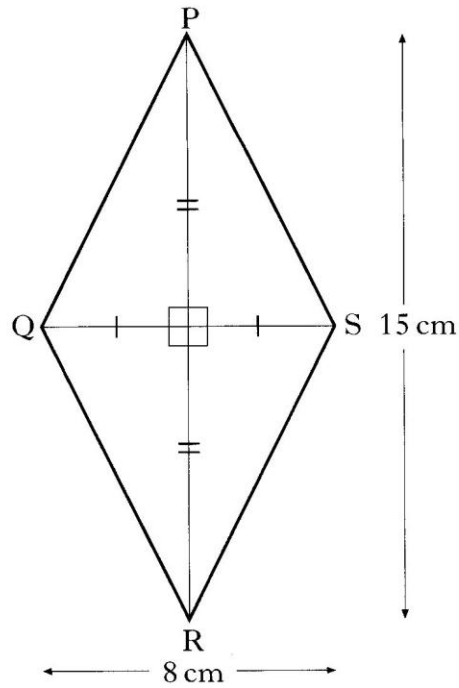
3

[Turn over

Marks

13. PQRS is a rhombus.

The diagonals PR and QS are 15 centimetres and 8 centimetres long as shown.



Calculate the length of side PQ.

**Do not use a scale drawing.**

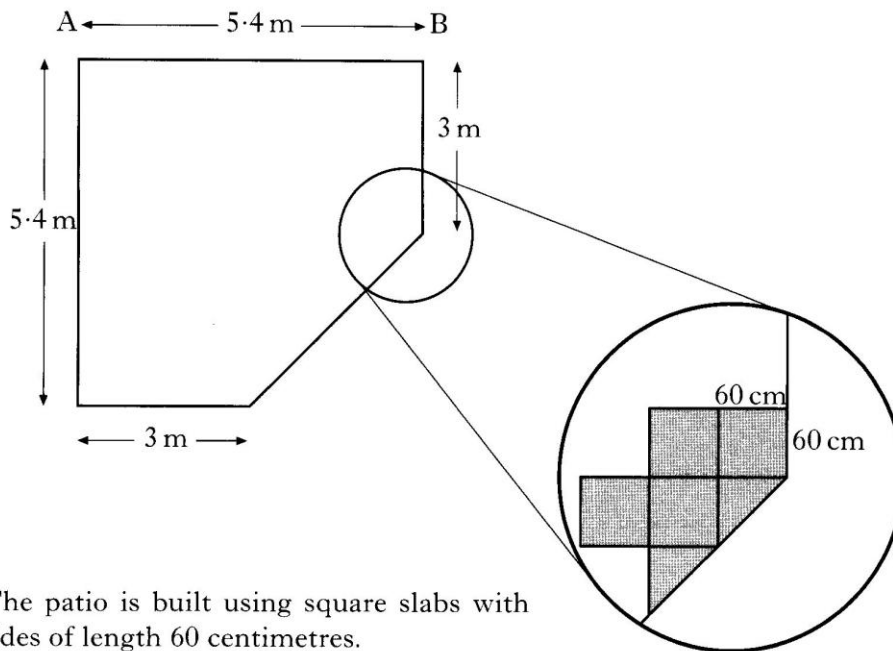
3

14. Margaret is recovering from an operation.  
She needs to take 4 tablets each day for a year.  
The tablets are supplied in boxes of 200.  
Each box costs £6.50.  
How much does it cost for the year's supply?

3

Marks

15. The diagram below shows a plan of a patio.



The patio is built using square slabs with sides of length 60 centimetres.  
The slabs can be cut in half to fit as shown.

- (a) How many slabs fit exactly along edge AB?
- (b) How many slabs are needed altogether to build the patio?

1

4

[END OF QUESTION PAPER]