FOR OFFICIAL USE

Total mark

X100/101

NATIONAL QUALIFICATIONS 2006

FRIDAY, 19 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

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

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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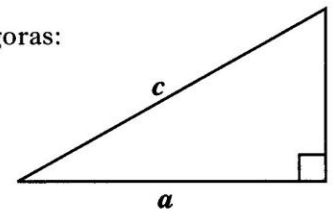
LI X100/101 6/12870

FORMULAE LIST

Circumference of a circle: $C = \pi d$

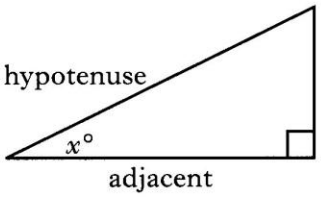
Area of a circle: $A = \pi r^2$

Theorem of Pythagoras:



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

Trigonometric ratios in a right angled triangle:



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

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

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

DO NOT WRITE IN THIS MARGIN

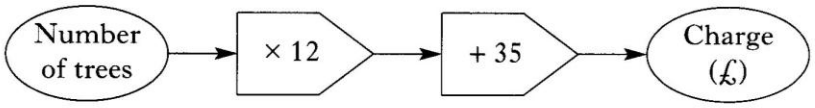
Marks

ALL questions should be attempted.

1. Find 5·42 – 1·8.

1

2. A tree surgeon uses this rule to work out his charge in pounds for uprooting and removing trees.



How much would he charge to uproot and remove 11 trees?

2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

3. Paula runs a 1500 metre race at an average speed of 6 metres per second.
How long does she take to run the race?
Give her time in minutes and seconds.

3

4. The table below shows insurance premiums for holidays abroad.

	INSURANCE PREMIUM per adult		
	Europe	Worldwide	Winter Sports
Up to 8 days	£15	£30	£40
9–17 days	£20	£40	£55
18–26 days	£30	£60	£80

Child premium (0–15 years) is 70% of the adult premium.

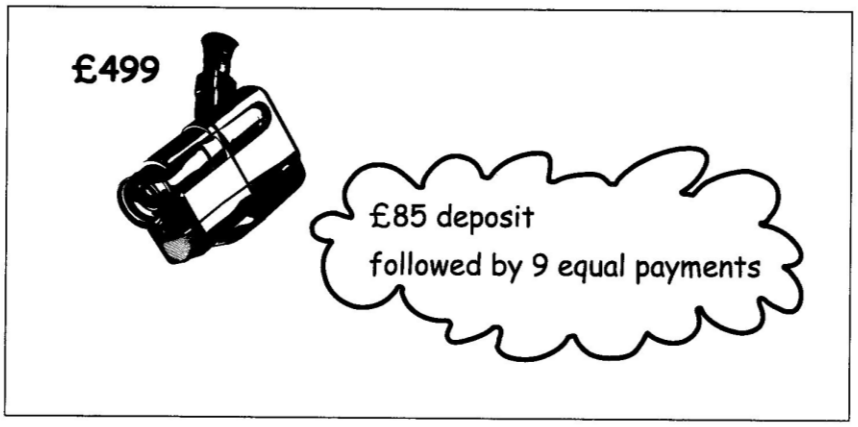
Mr and Mrs Fleming and their 5 year old son go to the USA for a three week holiday in July.
Find the **total** insurance premium for the family.

3

DO NOT WRITE IN THIS MARGIN

Marks

5. The hire purchase price of this camcorder is £499.



How much will each payment be?

3

6. Solve algebraically the equation

$$5n + 9 = 51 - 2n.$$

3

[Turn over

DO NOT WRITE IN THIS MARGIN

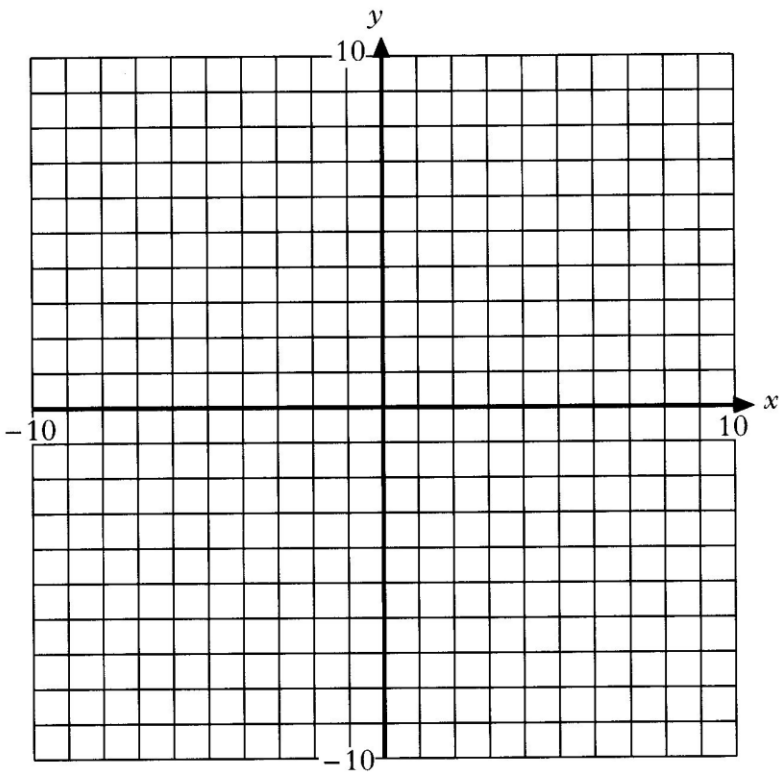
Marks

7. (*a*) Complete the table below for $y = 2 + 3x$.

x	-3	0	2
y			

2

(*b*) Draw the line $y = 2 + 3x$ on the grid.



2

DO NOT WRITE IN THIS MARGIN

Marks

8. A television programme has a phone-in to raise money for charity.
The calls cost 70 pence per minute.
The charity receives $\frac{3}{5}$ of the cost of each call.
How much money will the charity receive from a call which lasts $2\frac{1}{2}$ minutes?

3

9. Use the formula below to find the value of I when $P = 144$ and $R = 4$.

$$I = \sqrt{\frac{P}{R}}$$

3

[Turn over for Question 10 on *Page eight*

DO NOT WRITE IN THIS MARGIN

Marks

10. This is a number cell.

1st	2nd	3rd	4th
3	−2	1	−1

- 1st number + 2nd number = 3rd number $3 + (-2) = 1$
- 2nd number + 3rd number = 4th number $(-2) + 1 = -1$

(*a*) Complete this number cell.

4	−6		

1

(*b*) Complete this number cell.

		−1	4

2

(*c*) Complete this number cell.

1			−7

2

YOU MAY USE THE BLANK NUMBER CELLS BELOW FOR WORKING IF YOU WISH.

[END OF QUESTION PAPER]

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NATIONAL QUALIFICATIONS 2006

FRIDAY, 19 MAY
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MATHEMATICS INTERMEDIATE 1

Units 1, 2 and 3
Paper 2

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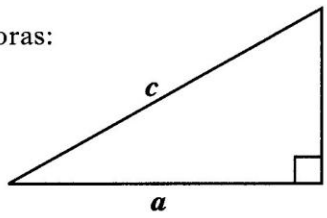

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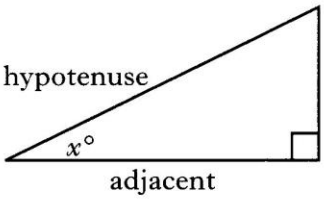

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DO NOT WRITE IN THIS MARGIN

Marks

ALL questions should be attempted.

1. During a holiday in Mexico, Lee changed £650 into pesos.
The exchange rate was £1 = 19·13 pesos.
How many pesos did Lee receive for £650?
Round off your answer to the nearest ten pesos.

2

2. Light travels one mile in about 0·000 005 4 seconds.
Write this time in standard form.

2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

3. Solve algebraically the inequality

$$4t - 7 > 29.$$

2

4. The number of bricks needed to build a wall is proportional to the area of the wall.

A wall with an area of 4 square metres needs 260 bricks.

How many bricks are needed for a wall with an area of 7 square metres?

2

DO NOT WRITE IN THIS MARGIN

Marks

5. A group of 40 students sit a test.

The marks scored by the students in the test are shown in the frequency table below.

Mark	*Frequency*
14	6
15	10
16	7
17	7
18	5
19	3
20	2

(*a*) Write down the modal mark.

1

(*b*) Find the probability of choosing a student from this group with a mark of 19.

1

(*c*) Complete the table below and calculate the mean mark for the group.

Mark	*Frequency*	*Mark* × *Frequency*
14	6	84
15	10	150
16	7	112
17	7	119
18	5	
19	3	
20	2	
	Total = 40	Total =

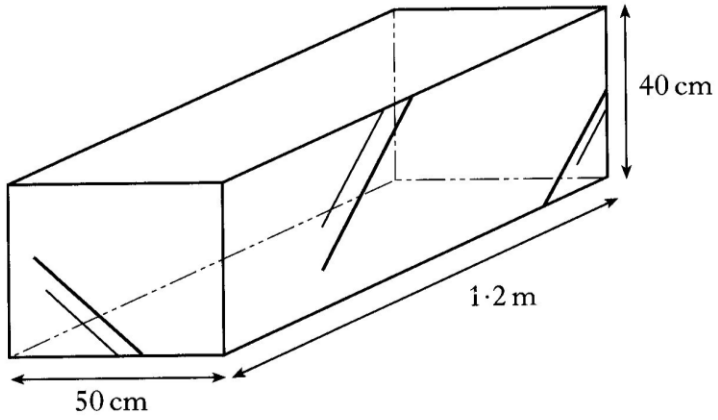
3

DO NOT WRITE IN THIS MARGIN

Marks

6. A water tank is 50 centimetres wide, 1·2 metres long and 40 centimetres high. Calculate its volume.

Give your answer in litres.
(1 litre = 1000 cubic centimetres.)



3

7. (*a*) Multiply out the brackets and simplify

$$3y + 2(x - 4y).$$

2

(*b*) Factorise $8d + 12$.

2

DO NOT WRITE IN THIS MARGIN

Marks

8. Every morning for one week, Wellburgh Council carried out a traffic survey at a busy junction.

The number of cars waiting to turn right at the junction was counted every five minutes between 8 am and 9 am.

On Monday morning the results were:

10 14 17 12 14 11 13 7 8 7 6 2.

Calculate:

(*a*) the median;

2

(*b*) the range.

2

On Saturday morning, the median was 6 and the range was 8.

(*c*) Make **two** comments comparing the number of cars waiting to turn right at the junction on Monday morning and Saturday morning.

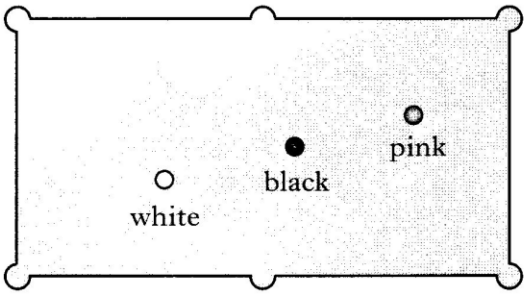
2

[Turn over

Marks

9. Stephen is playing snooker.

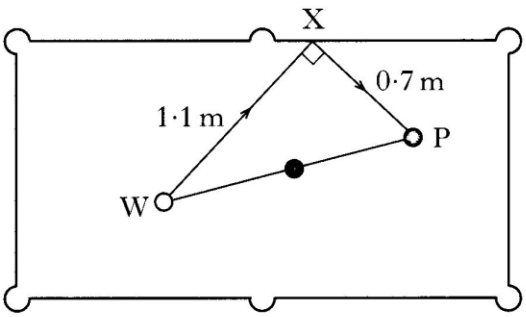
The diagram below shows the positions of three balls on the table.



Stephen plays the white ball, W.

It bounces off the side of the table at X and hits the pink ball, P.

- Distance WX is 1·1 metres
- Distance XP is 0·7 metres
- Angle WXP is 90°



Calculate distance WP.

Do not use a scale drawing.

3

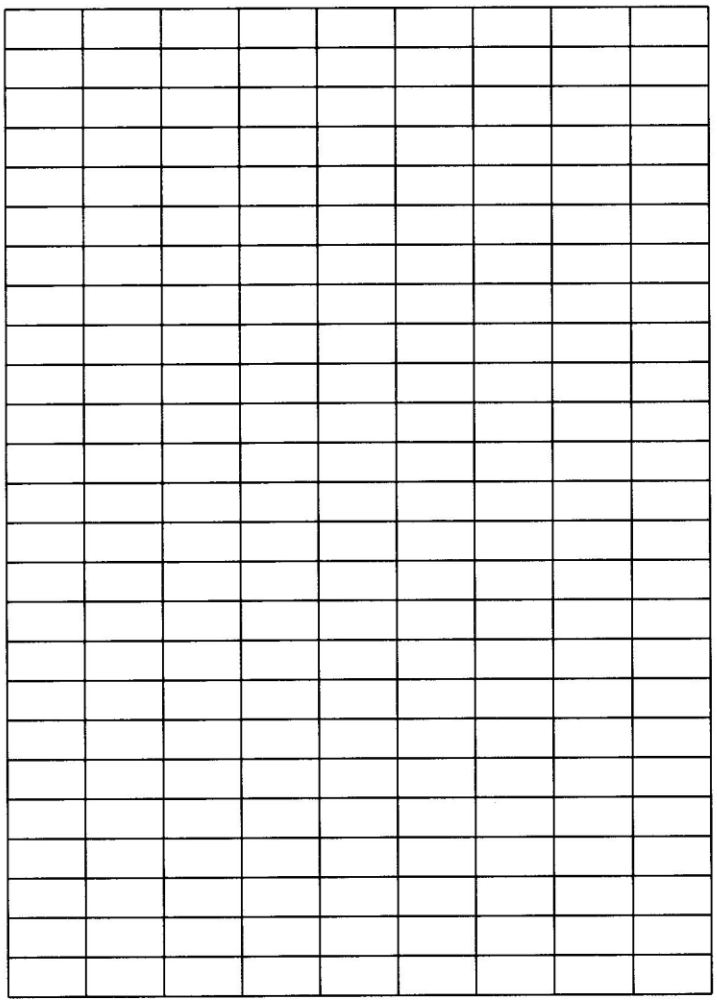
DO NOT WRITE IN THIS MARGIN

Marks

10. The table below shows the stopping distances of a car, when the brakes are applied, at different speeds.

Speed (miles per hour)	0	10	20	30	40
Stopping distance (feet)	0	15	40	75	120

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



4

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

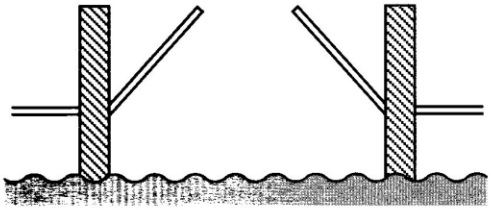
11. Ralph invests £2600 in a building society account.
The rate of interest is 4·5% per annum.
Calculate the interest he should receive after 8 months.

3

DO NOT WRITE IN THIS MARGIN

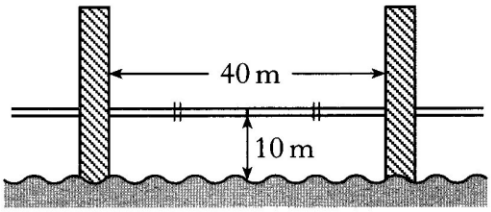
Marks

12. A road bridge can be raised in the **centre** to allow ships to pass through.



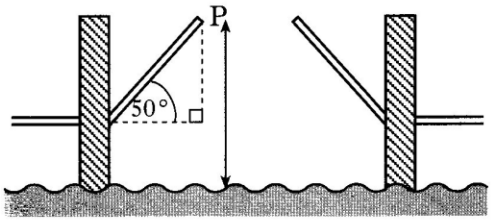
The moveable sections of the bridge are:

- 10 metres above the water level
- 40 metres long altogether.



The moveable sections are raised through 50° to allow a ship to pass through.

Calculate the height of the point P above the water level.



Do not use a scale drawing.

5

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

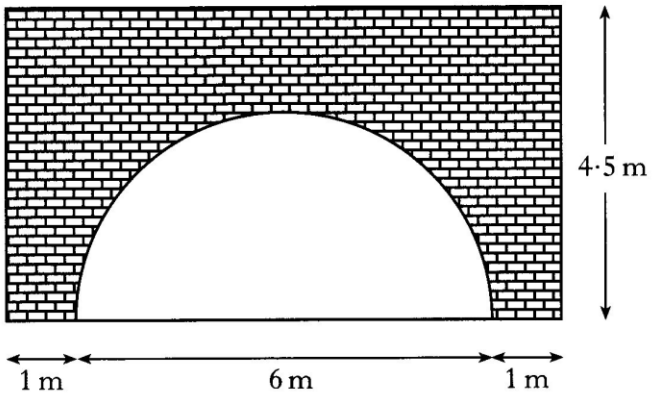
13. Andrew designs a website to advertise his hotel.
In the first month he has 250 visitors to his site.
The following month he has 300 visitors.
Calculate the percentage increase in the number of visitors.

4

DO NOT WRITE IN THIS MARGIN

Marks

14. The diagram below shows the wall at the start of a tunnel.



The wall is in the shape of a rectangle with a semi-circular space for the tunnel.

Calculate the area of the wall in square metres.

Give your answer correct to one decimal place.

5

[END OF QUESTION PAPER]