

FOR OFFICIAL USE

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X101/102

NATIONAL
QUALIFICATIONS
2006

FRIDAY, 19 MAY
1.00 PM – 1.35 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

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Forename(s)

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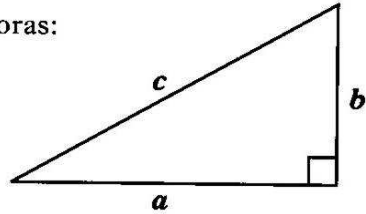
- 1 You may **NOT** use a calculator.
- 2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.
- 3 Full credit will be given only where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

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

Theorem of Pythagoras:



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

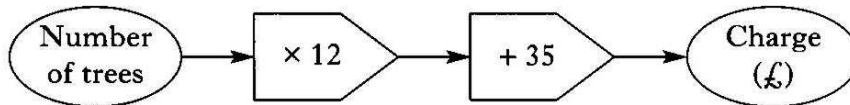
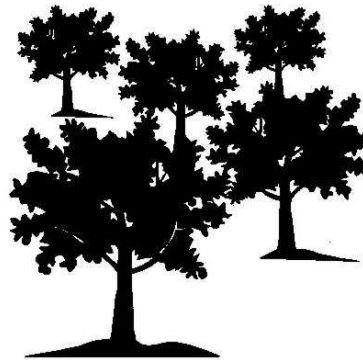
Marks

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

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

Marks

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

£499



£85 deposit
followed by 9 equal payments

How much will each payment be?

3

[Turn over

Marks

6. The table below shows the **monthly repayments** to be made when money is borrowed from a finance company.
Repayments can be made with or without loan protection.

| Loan amount | 24 months | | 36 months | | 48 months | |
|-------------|----------------------|-------------------------|----------------------|-------------------------|----------------------|-------------------------|
| | With loan protection | Without loan protection | With loan protection | Without loan protection | With loan protection | Without loan protection |
| £15 000 | £740 | £668 | £514 | £458 | £414 | £355 |
| £10 000 | £493 | £445 | £343 | £304 | £276 | £237 |
| £ 8000 | £394 | £356 | £274 | £244 | £220 | £189 |
| £ 5000 | £246 | £222 | £171 | £152 | £138 | £118 |

- (a) Johann borrows £10 000 over 4 years **with loan protection**.
How much is his monthly repayment?

1

- (b) After 40 months Johann loses his job.
The finance company makes the rest of the repayments for him.
How much does the finance company pay?

2

Marks

7. Ali is a baker. His payslip for the week ending 5th May is shown below. There are some missing entries.

| | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| Name: Ali Hackram | | Week ending: 5/5/06 | |
| Basic Pay £262.80 | Overtime £32.85 | Bonus £20.00 | Gross Pay |
| Income Tax £43.07 | National Insurance | Pension £18.94 | Total Deductions |
| | | | Net Pay £225.43 |

Calculate Ali's:

(a) gross pay;

1

(b) total deductions;

1

(c) national insurance.

2

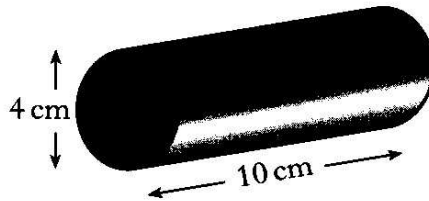
[Turn over

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. A toilet roll holder is in the shape of a cylinder with diameter 4 centimetres and length 10 centimetres.



Calculate the curved surface area of the holder.
Use $\pi = 3.14$.

3

Marks

10. This is a number cell.

| 1st | 2nd | 3rd | 4th |
|-----|-----|-----|-----|
| 3 | -2 | 1 | -1 |

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

$$3 + (-2) = 1$$

$$(-2) + 1 = -1$$

(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.

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[END OF QUESTION PAPER]

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Units 1, 2 and
Applications of Mathematics
Paper 2

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Forename(s)

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Date of birth

Day Month Year

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Scottish candidate number

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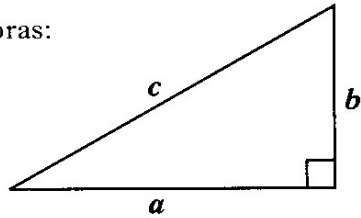
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Marks

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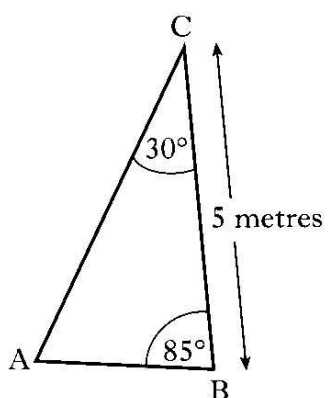
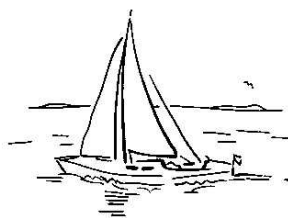
1. During a holiday in Mexico, Lee changed £650 into pesos.
The exchange rate was £1 = 19·13 pesos.
How many pesos did Lee receive for £650?
Round off your answer to the nearest ten pesos.

2

[Turn over

Marks

2. The sail of a yacht is sketched below.



- (a) Make a scale drawing of the sail.
Use a scale of 1 cm to 50 cm.

- (b) Use your scale drawing to find the actual length of AB, the lower edge of the sail.
Give your answer in metres.

2

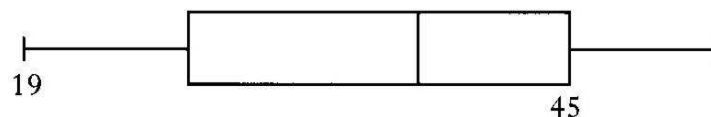
2

Marks

3. The ages of nine workers in an office are shown below.

23 34 51 19 31 43 38 40 47

Complete the boxplot, drawn below, to show the ages of the workers.



4

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

[Turn over

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.

| <i>Mark</i> | <i>Frequency</i> |
|-------------|------------------|
| 14 | 6 |
| 15 | 10 |
| 16 | 7 |
| 17 | 7 |
| 18 | 5 |
| 19 | 3 |
| 20 | 2 |

- (a) Write down the modal mark.
- (b) Find the probability of choosing a student from this group with a mark of 19.
- (c) Complete the table below and calculate the mean mark for the group.

| <i>Mark</i> | <i>Frequency</i> | <i>Mark × Frequency</i> |
|-------------|------------------|-------------------------|
| 14 | 6 | 84 |
| 15 | 10 | 150 |
| 16 | 7 | 112 |
| 17 | 7 | 119 |
| 18 | 5 | |
| 19 | 3 | |
| 20 | 2 | |
| Total = 40 | | Total = |

1

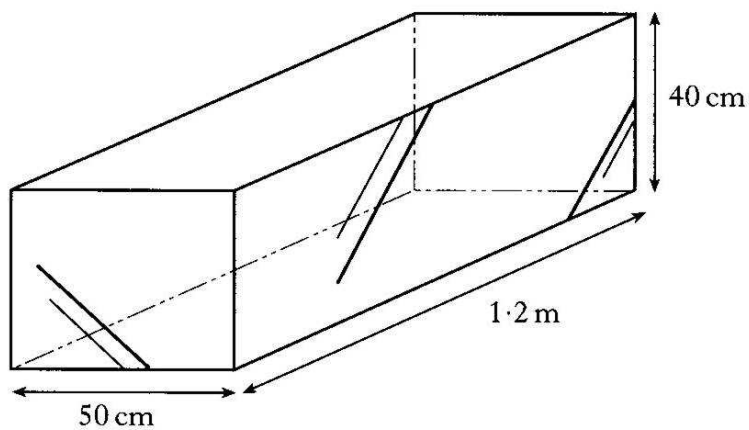
1

3

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.)



Marks

3

[Turn over

Marks

7. 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.

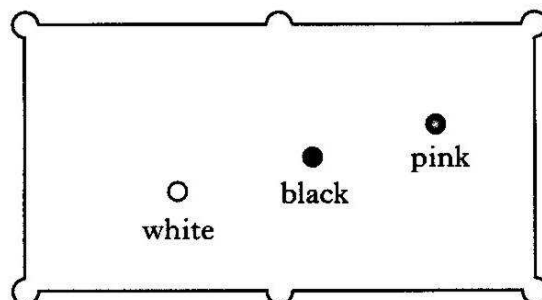
- (c) Make **two** comments comparing the number of cars waiting to turn right at the junction on Monday morning and Saturday morning.

2

Marks

8. Stephen is playing snooker.

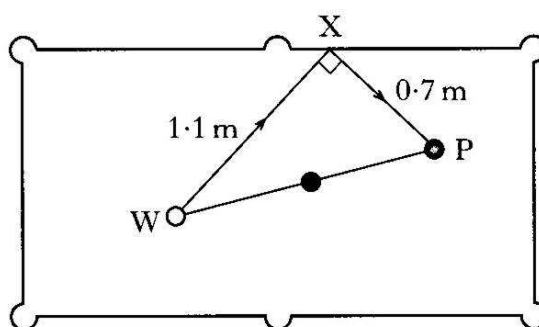
The diagram below shows the positions of three balls on the table.



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

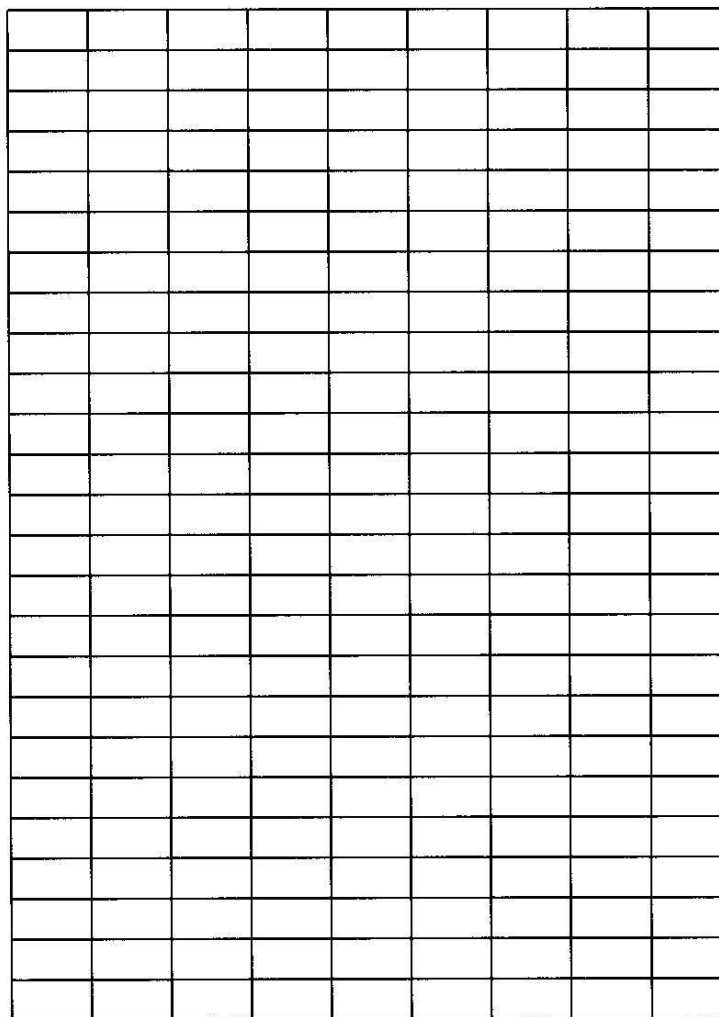
[Turn over

Marks

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

| | | | | | |
|---------------------------------|---|----|----|----|-----|
| <i>Speed</i> (miles per hour) | 0 | 10 | 20 | 30 | 40 |
| <i>Stopping distance</i> (feet) | 0 | 15 | 40 | 75 | 120 |

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



4

10. 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.

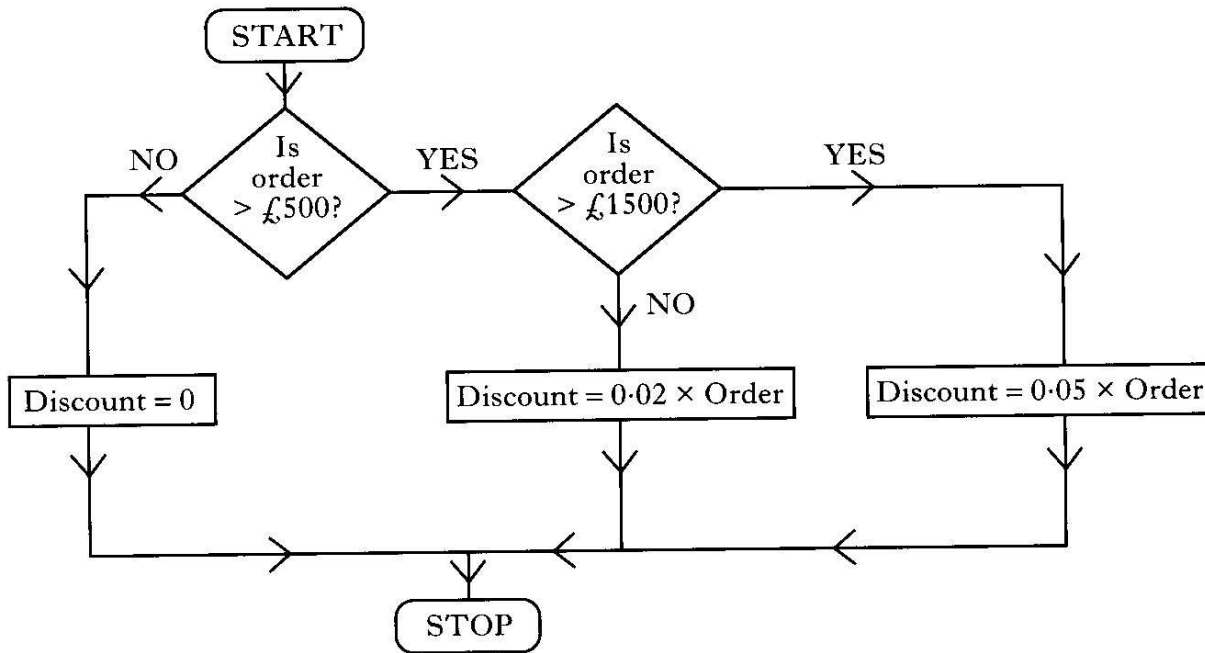
Marks

3

[Turn over

Marks

11. A supplier gives shopkeepers a discount on large orders of bottled water. The flowchart below is used to work out the discount in pounds.



- (a) A shopkeeper orders £800 worth of bottled water from this supplier **every week**.
How much does she pay each week for this order?

2

- (b) The shopkeeper decides to order £1600 worth of bottled water **once every fortnight** instead of an £800 order every week.
How much **less** will she pay every fortnight?

3

Marks

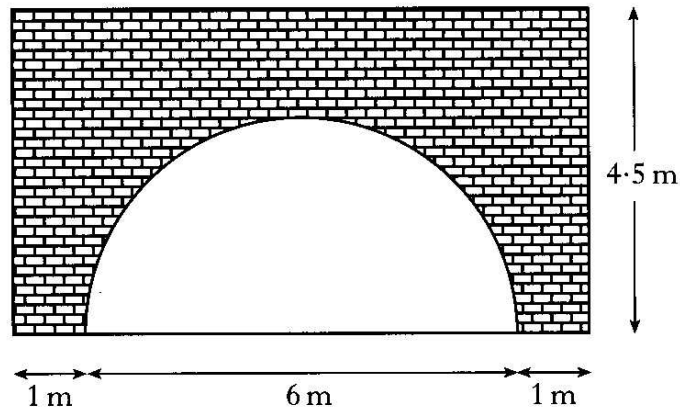
12. Andrew designs a website to advertise his hotel.
In the first month he has 250 visitors to his site.
The following month he has 300 visitors.
Calculate the percentage increase in the number of visitors.

4

[Turn over for Question 13 on *Page fourteen*]

Marks

13. 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]