FOR OFFICIAL USE

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|---|---|---|---|---|---|
| | | | | | |

Total marks

# X056/101

NATIONAL QUALIFICATIONS 2000

THURSDAY, 25 MAY
9.00 AM – 9.35 AM

# MATHEMATICS INTERMEDIATE 1 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 There are three Sections in this paper.

Section A assesses the compulsory units Mathematics 1 and 2.
Section B assesses the optional unit Mathematics 3.
Section C assesses the optional unit Applications of Mathematics.

Candidates must attempt **all questions in** Section A (Mathematics 1 and 2) **and**

**either** Section B (Mathematics 3)

**or** Section C (Applications of Mathematics).

3 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.

4 Full credit will be given only where the solution contains appropriate working.

5 Before leaving the examination room you must give this book to the invigilator. If you do not you may lose all the marks for this paper.

SCOTTISH QUALIFICATIONS AUTHORITY

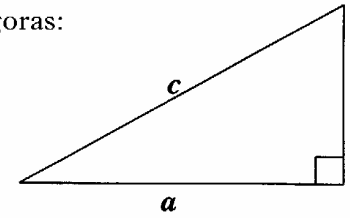
**FORMULAE LIST**

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

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

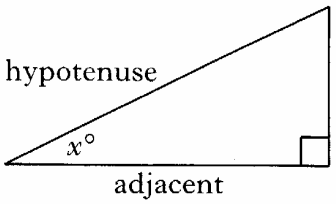
Curved surface area of a cylinder: $A = 2\pi rh$

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

## SECTION A (Mathematics 1 and 2)

**ALL candidates should attempt this Section.**

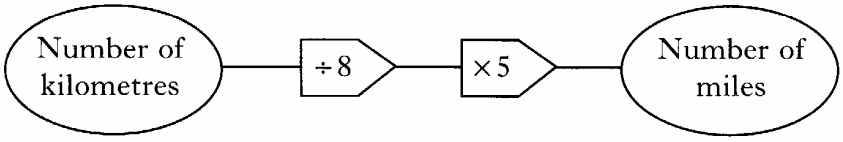
**A1.** (*a*) Find 25% of £300.

1

(*b*) Find $\frac{2}{3}$ of £6·99.

1

**A2.** The Anderson family use this rule to convert distances from kilometres to miles.




They are travelling to Bordeaux when they pass this road sign.


How many **miles** have they to travel to Bordeaux?

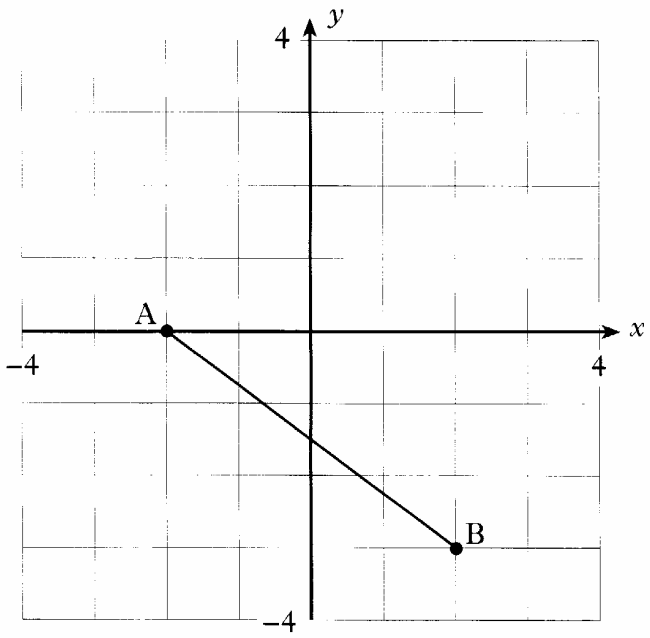
2

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**A3.** (*a*) Write down the coordinates of the points A and B marked on this diagram.




2

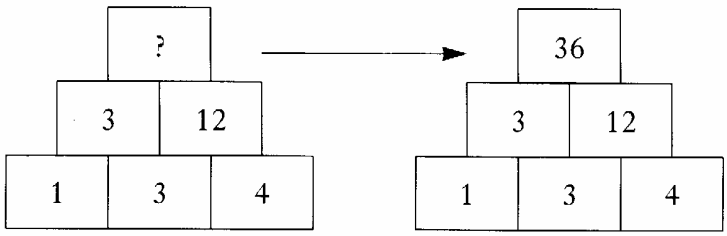
(*b*) **Calculate** the length of the line joining A to B.
**Do not measure with a ruler.**
**You must show your working.**

4

*Marks*

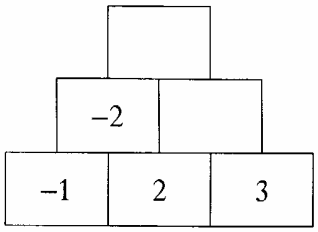
**A4.** **Rule**: The number in a box is always equal to the two numbers in the boxes below it multiplied together.

*Example*



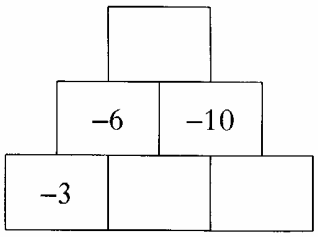

Use the rule to complete the diagrams below.

(*a*)




**2**

(*b*)




**3**

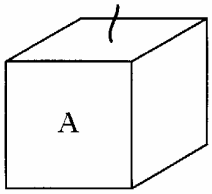
**[Turn over**

DO NOT WRITE IN THIS MARGIN

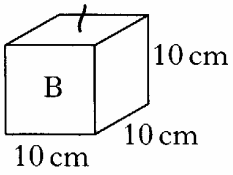
*Marks*

**A5.** The diagram below shows two candles.
Each candle is in the shape of a cube.
The length of time that each candle will burn is proportional to its volume.

Candle A has a volume of $1500\,cm^3$.
It will burn for 30 hours.




For how long will candle B burn?




4

*[END OF SECTION A]*

**Candidates should now attempt**
**EITHER Section B (Mathematics 3) on *Pages seven* and *eight***
**OR Section C (Applications of Mathematics) on *Pages nine to twelve.***

DO NOT WRITE IN THIS MARGIN

*Marks*

## SECTION B (Mathematics 3)

**ONLY candidates doing the course Mathematics 1, 2 and 3 should attempt this Section.**

**B6.** (*a*) Solve algebraically the equation

$$5x + 1 = x + 7.$$

**3**

(*b*) Solve algebraically the inequality

$$6y - 1 < 11.$$

**2**

**B7.** Factorise $3x - 12$.

**2**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

Marks

**B8.** Multiply out the brackets and simplify

$$7(2a + 1) - 3a.$$

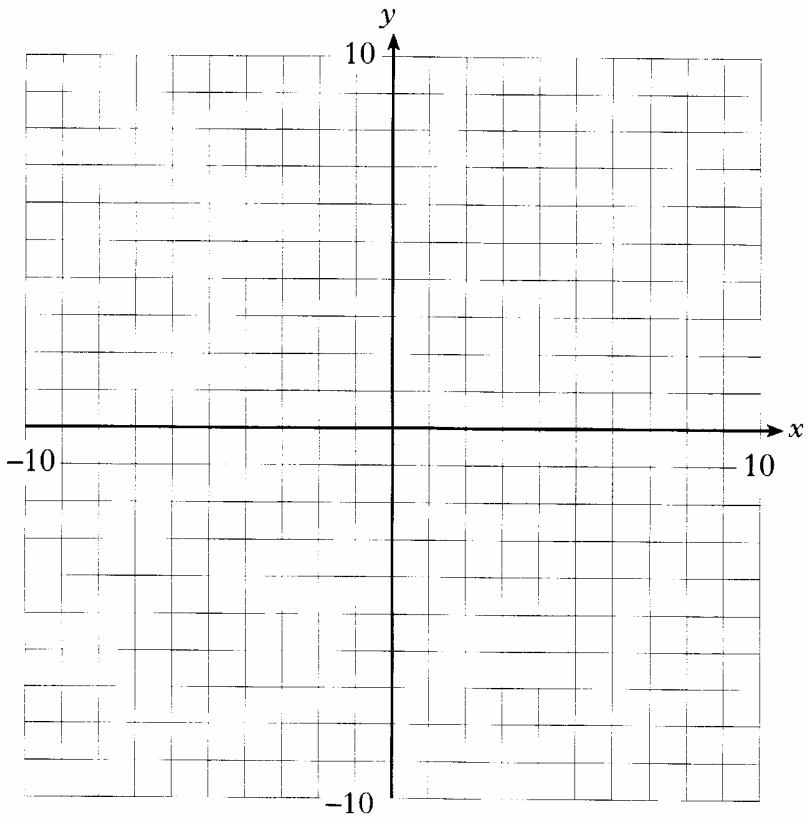
2

**B9.** (*a*) Complete the table below for $y = 3x - 2$.

| $x$ | $-2$ | 0 | 3 |
|---|---|---|---|
| $y$ | | | |

2

(*b*) Using the table in part (*a*), draw the graph of $y = 3x - 2$ on the grid.




2

*[END OF SECTION B]*

DO NOT WRITE IN THIS MARGIN

Marks

## SECTION C (Applications of Mathematics)

**ONLY candidates doing the course Mathematics 1, 2 and Applications of Mathematics should attempt this Section.**

**C6.** A shop uses a spreadsheet to work out the value of the stock.

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Item | Number | Price of | Total value |
| 2 | | in stock | item in £ | in £ |
| 3 | Chocolate bars | 23 | 0.24 | 5.52 |
| 4 | Crisps | 61 | 0.25 | 15.25 |
| 5 | Cartons of orange juice | 19 | 0.30 | 5.70 |
| 6 | Apples | 5 | 0.21 | 1.05 |
| 7 | Small bottles of cola | 41 | 0.28 | 11.48 |
| 8 | Bananas | 8 | 0.18 | |
| 9 | | | | |
| 10 | | Total value of stock | | |
| 11 | | | | |

(*a*) The owner wants to work out the total value of the bananas.
What formula does she use in cell D8 to find this?

1

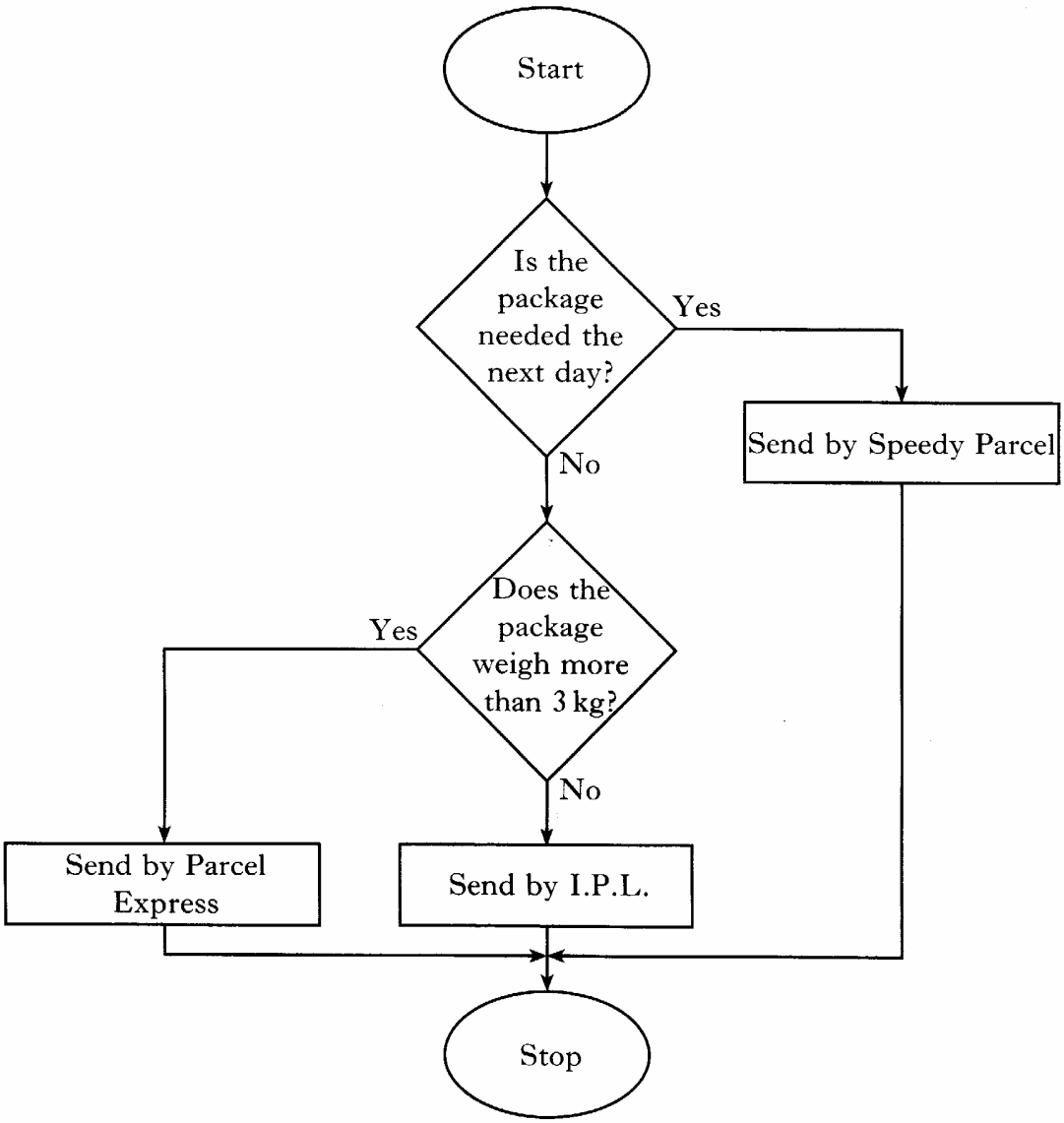
(*b*) What formula would she put into cell D10 to work out the total value of all of the stock?

1

**[Turn over**

*Marks*

**C7.** A computer supply company uses a flowchart to decide how to deliver packages to their customers.




They are going to send a package weighing 3·8 kg which is not needed the next day. Which delivery service do they choose?

Explain your answer.

2

*Marks*

**C8.** Army cadets set off on a training exercise from a camp at C.

They walk for 8 kilometres on a bearing of 048° from position C until they reach a bridge at B.

At the bridge they change direction and walk for a further 5 kilometres on a bearing of 142° from B, arriving at D.

(*a*) Make a scale drawing of this walk.


3

(*b*) Use your scale drawing to find the direct distance from C to D.

2

**[Turn over for Question C9 on *Page twelve***

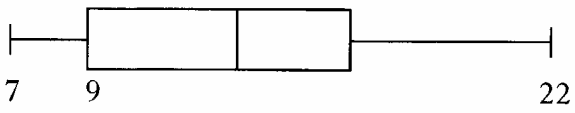
*Marks*

**C9.** A group of students sat a Mathematics test.
The marks scored in the test are shown below.

8 8 9 10 14 11 15 7 16 19 22 11 16 17 18

(*a*) Find the median mark. **2**

(*b*) Complete the boxplot, drawn below, to show the marks scored by the students in the Mathematics test. **2**




*[END OF SECTION C]*

*[END OF QUESTION PAPER]*

FOR OFFICIAL USE

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

Total marks

# X056/102

NATIONAL QUALIFICATIONS 2000

THURSDAY, 25 MAY
9.55 AM – 10.50 AM

# MATHEMATICS INTERMEDIATE 1 Paper 2

**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

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SCOTTISH QUALIFICATIONS AUTHORITY

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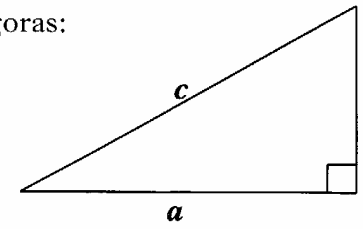


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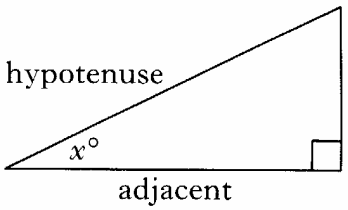


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$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

*Marks*

## SECTION A (Mathematics 1 and 2)

**ALL candidates should attempt this Section.**

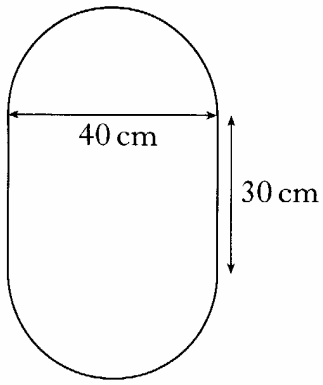
**A1.**

| ALBION BANK PLATINUM ACCOUNT | |
|---|---|
| **Amount** | **Annual Rate of Interest** |
| Up to £1000 | 2·5% |
| £1001–£5000 | 3·6% |
| £5001–£10 000 | 4·7% |

Maxine invests £2000 in a Platinum Account with the Albion Bank.
Calculate the interest she should receive after 4 months.

4

**A2.** This mirror is in the shape of a rectangle with semi-circular ends.
It has a wooden edge all the way round the outside.




Calculate the total length of the wooden edge.
Give your answer to the nearest centimetre.

5

Marks

**A3.** David ordered a bouquet of flowers from "Teleflora" for his mother's birthday.

- The bouquet consisted of 12 flowers.
- The bouquet contained both roses and carnations.
- More than half of the flowers in the bouquet were roses.

One combination of roses and carnations in the bouquet is shown in the table below.

| *Roses* | *Carnations* |
|---|---|
| 10 | 2 |
| | |
| | |
| | |
| | |

(*a*) Complete the table to show all the possible combinations of roses and carnations in the bouquet. **2**

(*b*) Teleflora's prices are shown below.

| | |
|---|---|
| Roses | £2·50 each |
| Carnations | £1·00 each |
| Packaging and delivery | £5·00 |

David's bill for the bouquet was £29, including packaging and delivery.

How many roses and how many carnations were in the bouquet?

**You must show your working.**

**3**

Marks

**A4.** This table shows the **monthly premiums** charged by three companies for every £10 000 worth of life assurance cover.

| *Monthly Premium for £10 000 worth of cover (Age 30 next birthday)* | | |
|---|---|---|
| | *Women* | *Men* |
| General Alliance | £18·50 | £24·60 |
| Insure Direct | £14·60 | £21·90 |
| Regal Life | £19·15 | £25·85 |

(*a*) Cameron Clarke is 29 years old.
He takes out a £75 000 life assurance policy with Insure Direct.
Calculate his monthly premium.

3

(*b*) His wife Catriona is also 29 years old.
She has a £10 000 life assurance policy with General Alliance.
How much will she save per **year** if she changes her insurance company to Insure Direct?

2

**[Turn over**

Marks

**A5.** The film *Space Trek* was shown ten times during one week at the Globe cinema.

The stem and leaf diagram below indicates the attendance figures.

**Attendance Figures**
**Space Trek**

| | |
|---|---|
| 4 | 1 7 8 |
| 5 | 2 3 5 6 |
| 6 | 0 4 |
| 7 | 5 |

5 | 2 represents 52 people

(*a*) What was the minimum attendance at a single showing of *Space Trek* during the week?

1

(*b*) Calculate the range of the attendance figures.

2

Marks

**A5. (continued)**

(*c*) *Castle of Horror* was also shown ten times at the Globe cinema during the same week.

The stem and leaf diagram below indicates the attendance figures for both films.

**Attendance Figures**

| Castle of Horror | | Space Trek |
|---|---|---|
| 8 | 4 | 1 7 8 |
| 4 0 | 5 | 2 3 5 6 |
| 1 1 1 | 6 | 0 4 |
| 7 6 5 3 | 7 | 5 |

5 | 2 represents 52 people

Compare the distribution of attendance figures for *Castle of Horror* and *Space Trek*.

1

**A6.** On the flight home from a holiday in Portugal, the air steward asked the passengers to donate to charity any Portuguese money that they had left.

The steward collected 29 600 escudos.

The exchange rate was 301 escudos to the pound sterling.

How much did the passengers donate?

Give your answer in pounds and pence.

3

**[Turn over**

DO NOT WRITE IN THIS MARGIN

Marks

**A7.** This frequency table shows the ages of the 40 members of a drama club.

| *Member's Age (years)* | *Frequency* |
|---|---|
| 23 | 8 |
| 24 | 12 |
| 25 | 6 |
| 26 | 10 |
| 27 | 4 |

(*a*) Calculate the mean age of the members.

**2**

(*b*) Find the probability that a member is 25 years old.

**1**

(*c*) What percentage of the members are under 26 years old?

**3**

*Marks*

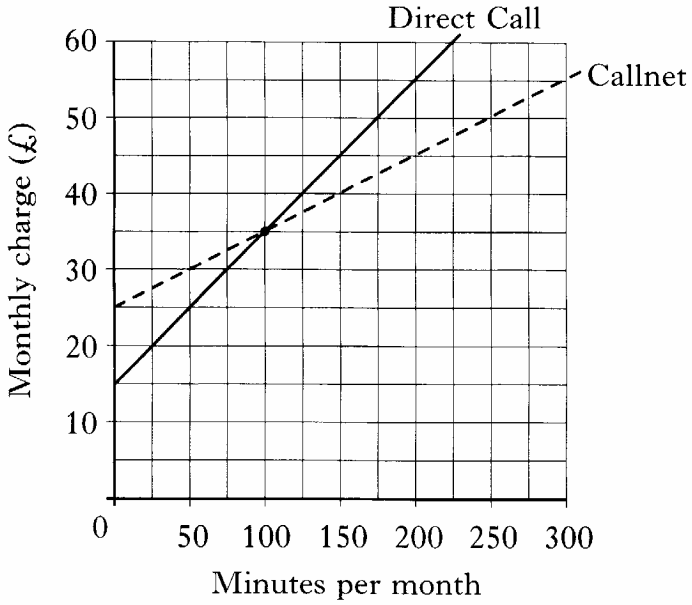
**A8.** The mean weight of the four students listed in the table is 57·5 kilograms.

| *Name* | *Weight* (kg) |
|---|---|
| Chris | 57 |
| Lee | 62 |
| Jo | 55 |
| Pat | |

Calculate Pat's weight.

2

**A9.** This graph shows the monthly charge for renting mobile telephones from two companies, **Direct Call** and **Callnet**.




Samantha wants to rent a mobile telephone from one of these companies.

**Use the information in the graph** to give Samantha reasons on which to base her choice of company.

3

*[END OF SECTION A]*

**Candidates should now attempt**

**EITHER Section B (Mathematics 3) on *Pages ten and eleven***

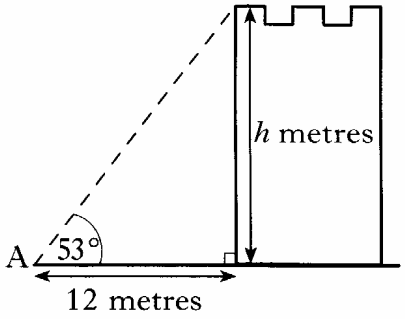
**OR Section C (Applications of Mathematics) on *Pages twelve and thirteen***

*Marks*

## SECTION B (Mathematics 3)

**ONLY candidates doing the course Mathematics 1, 2 and 3 should attempt this Section.**

**B10.** Point A is 12 metres from the bottom of a tower.
The angle of elevation from A to the top of the tower is 53°.




Calculate the height of the tower, $h$ metres, correct to 1 decimal place.

4

DO NOT WRITE IN THIS MARGIN

Marks

**B11.** (*a*) The population of Europe is 580 million.
Write this number in standard form.

**2**

(*b*) The distance, $S$ metres, travelled by a falling object in $t$ seconds is given by the formula

$$S = \frac{1}{2}gt^2.$$

Calculate the value of $S$ when $g = 9{\cdot}8$ and $t = 10$.

**3**

[*END OF SECTION B*]

**[Turn over**

DO NOT WRITE IN THIS MARGIN

Marks

## SECTION C (Applications of Mathematics)

**ONLY candidates doing the course Mathematics 1, 2 and Applications of Mathematics should attempt this Section.**

**C10.** The table shows the monthly payments to be made with and without loan protection when money is borrowed to buy a car.

**Car Loan Table**

| | 12 months | | 24 months | | 36 months | |
|---|---|---|---|---|---|---|
| Amount borrowed | with loan protection | without loan protection | with loan protection | without loan protection | with loan protection | without loan protection |
| £9000 | £901·68 | £818·50 | £520·37 | £438·10 | £394·47 | £309·15 |
| £6000 | £608·19 | £553·78 | £351·23 | £295·60 | £269·00 | £213·14 |
| £4000 | £407·28 | £368·02 | £233·98 | £196·86 | £181·22 | £142·25 |
| £2000 | £202·94 | £184·15 | £117·50 | £99·90 | £88·68 | £70·05 |
| £1000 | £100·99 | £92·76 | £60·00 | £51·30 | £45·07 | £34·88 |

Barbara wants to borrow £4000 over 36 months **with loan protection**.

(*a*) State her monthly payment. **1**

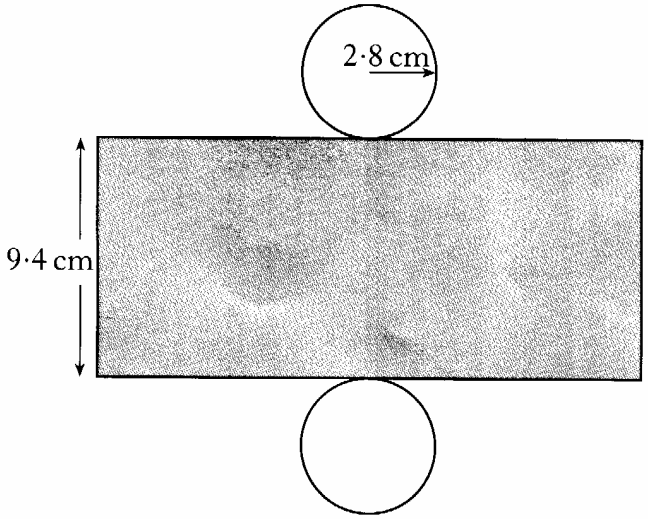
(*b*) Calculate her total repayment. **1**

(*c*) Calculate how much this loan costs Barbara. **2**

DO NOT WRITE IN THIS MARGIN

Marks

**C11.** The diagram below shows the net of a solid shape.




(*a*) Name the solid shape.

1

(*b*) Calculate the curved surface area of the solid shape.
Give your answer correct to 1 decimal place.

4

*[END OF SECTION C]*

*[END OF QUESTION PAPER]*