FOR OFFICIAL USE

Total Mark

X101/102

X1011001 1

NATIONAL QUALIFICATIONS 2010

FRIDAY, 21 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

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.

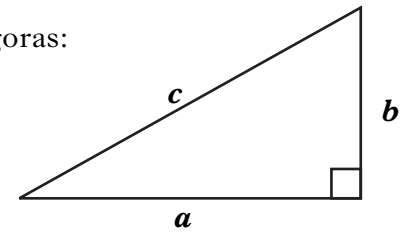
4 Before leaving the examination room you must give this book to the Invigilator. If you do not you may lose all the marks for this paper.

Use blue or black ink. Pencil may be used for graphs and diagrams only.

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:



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

DO NOT WRITE IN THIS MARGIN

Marks

ALL questions should be attempted.

1. (*a*) Find 9·22 − 5·3.

1

(*b*) Find 528 ÷ 300.

1

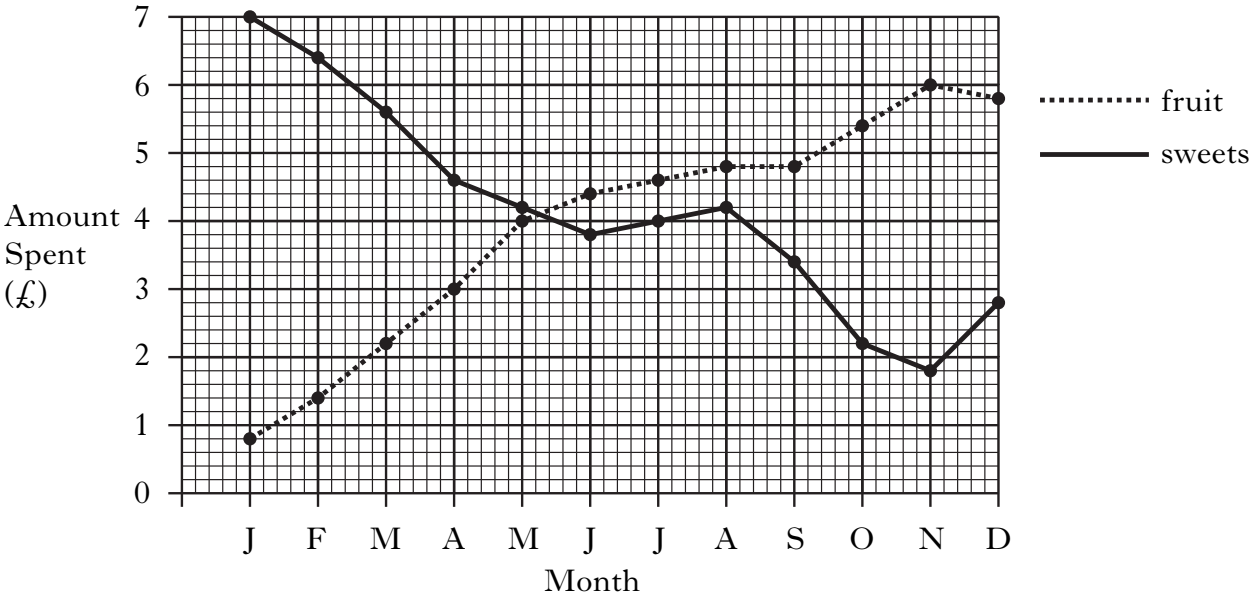
(*c*) Find 60% of 250.

1

[Turn over

Marks

2. The graph shows the amount Megan spent each month on fruit and on sweets during 2009.



(*a*) How much did Megan spend on fruit in February?

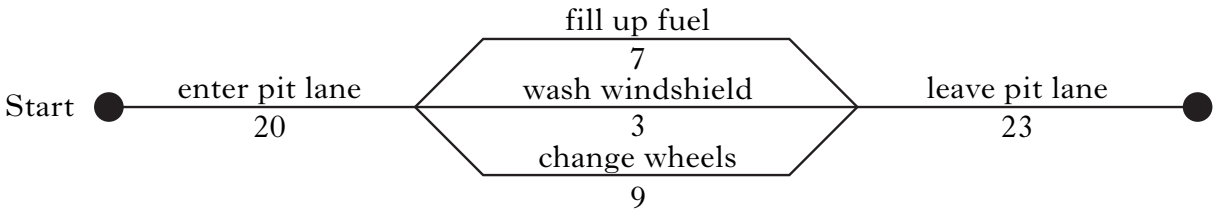
1

(*b*) Describe the trend in the amount Megan spent on **both** fruit and sweets.

1

Marks

3. The network diagram shows the time it took for a racing car to make a pit stop. All times are in seconds.



(*a*) How long did it take to change the wheels?

1

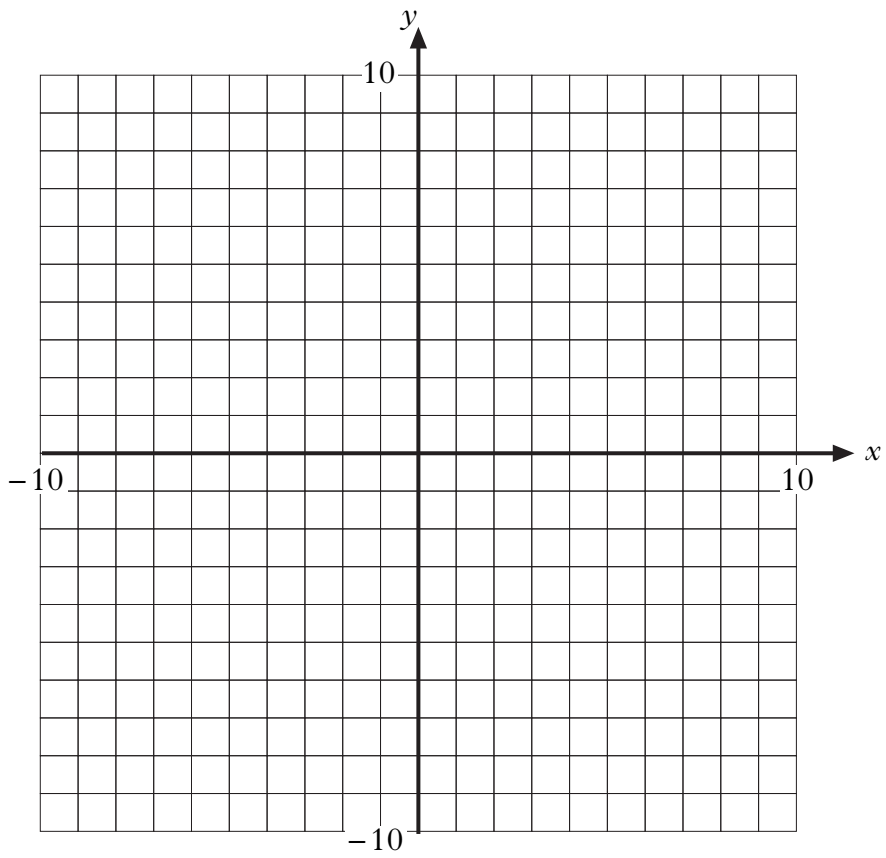
(*b*) How long did it take altogether for the pit stop from start to finish?

1

[Turn over

Marks

4. (*a*) On the grid below, plot the points A(–5,–2) and B(3,–2).



1

(*b*) Plot the point C so that triangle ABC is isosceles and has an area of 24 square units.

2

Marks

5. Malika wants to buy some home entertainment equipment from the items listed below.

Games Console
£120

DVD Recorder
£105

Video Recorder
£100

Set Top Box
£95

Surround Sound Speakers
£80

Malika wants to buy three items.

She can afford to spend a maximum of £300.

She does not want to buy more than one of each item.

One combination of three items that Malika can buy is shown in the table below.

Games Console £120	DVD Recorder £105	Video Recorder £100	Set Top Box £95	Surround Sound Speakers £80	Total Value
	✓		✓	✓	£ 280

Complete the table to show **all** possible combinations of three items that Malika can buy. **3**

Marks

6. Tom is going to cook a 3·5 kilogram turkey.
He uses this rule to calculate the cooking time:

"*Cook for 40 minutes per kilogram and then add an extra 25 minutes*."

Tom wants the turkey to be ready at 1.30 pm.
What is the latest time that he should begin cooking it?

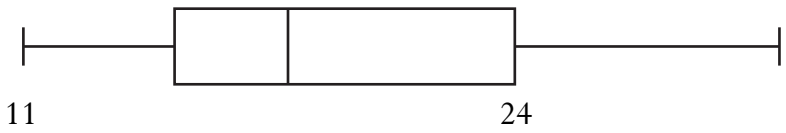
4

Marks

7. The number of hours of sunshine in Lerwick each December during a 10 year period is listed below.

16 20 13 11 28 16 31 24 15 23

Complete the boxplot, drawn below, to show the number of hours of sunshine.

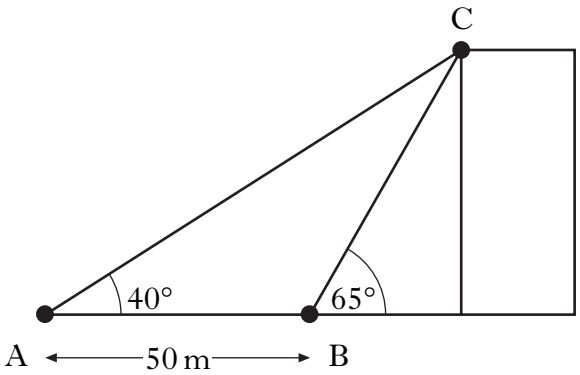


4

[Turn over

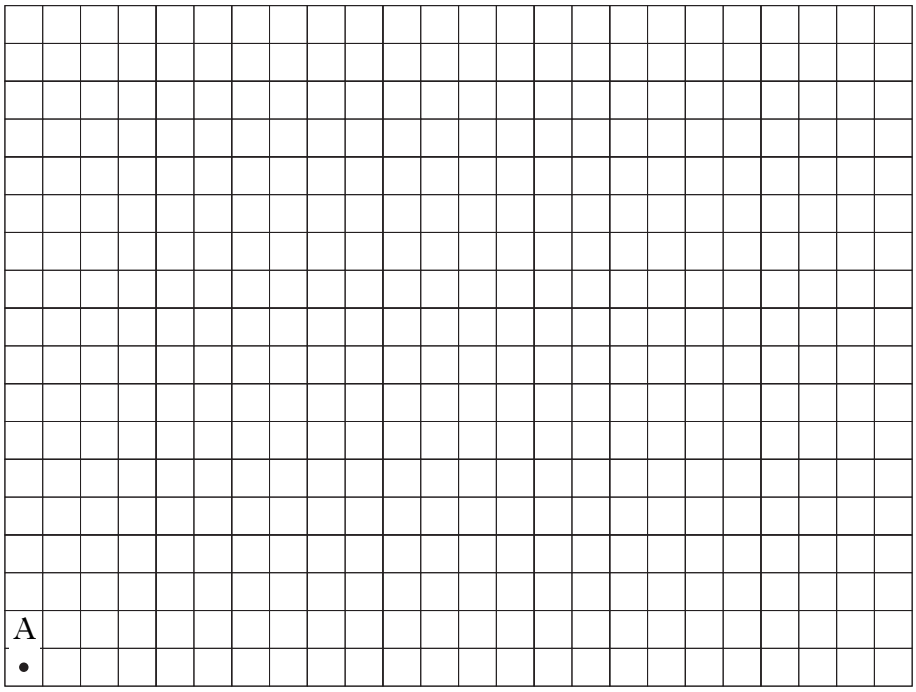
Marks

8. Zoe is finding the height of a building.



Points A and B are 50 metres apart.
Point C is at the top of the building.
The angle of elevation of Point C is
- 40° from Point A.
- 65° from Point B.

The position of Point A is shown on the grid below.



(*a*) Make a scale drawing to show the positions of Points B and C.
Use a scale of **1 cm to 10 m**. **2**

Marks

8. (continued)

(*b*) Use your scale drawing to find the actual height of the building.

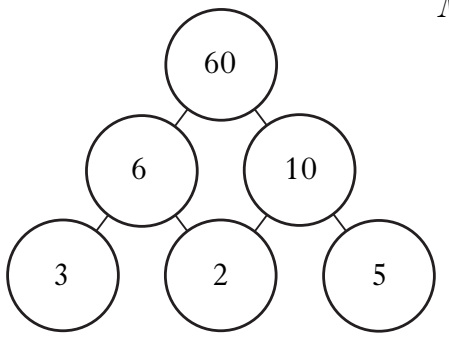
2

[Turn over for Question 9 on *Page twelve*

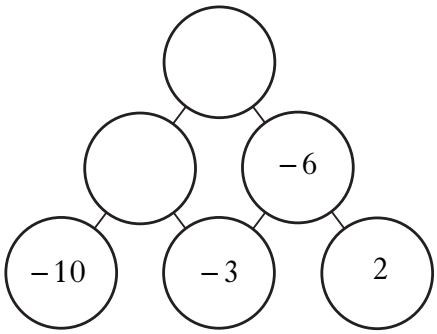
Marks

9. The rules to complete a number pyramid are:

- the number in a circle is equal to the two numbers in the circles immediately below it multiplied together.
- only positive and negative whole numbers can be used.

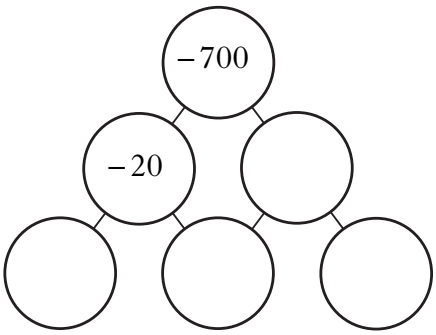


(*a*) Use the rules to complete this number pyramid.



2

(*b*) Use the rules to complete this number pyramid.



3

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

ADDITIONAL SPACE FOR ANSWERS

[BLANK PAGE]

[BLANK PAGE]

FOR OFFICIAL USE

X101/104

X1011002 1

Total Mark

NATIONAL QUALIFICATIONS 2010

FRIDAY, 21 MAY 1.55 PM – 2.50 PM

MATHEMATICS INTERMEDIATE 1

Units 1, 2 and Applications of Mathematics 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

1 **You may 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.

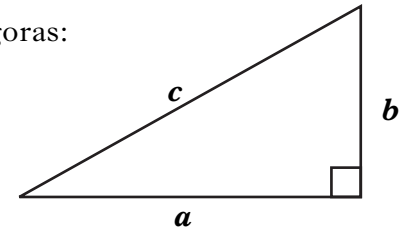
4 Before leaving the examination room you must give this book to the Invigilator. If you do not you may lose all the marks for this paper.

Use blue or black ink. Pencil may be used for graphs and diagrams only.

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:



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

ALL questions should be attempted.

Marks

1. A car travelling at an average speed of 80 kilometres per hour takes 2 hours 45 minutes for the journey from Dundee to Inverness.

Calculate the distance between the two towns.

2

2. Tanya takes out a life insurance policy worth £45 000.

The insurance company charges a monthly premium of £1·30 for every £1000 worth of cover.

How much will Tanya pay **annually** for this policy?

2

[Turn over

Marks

3. 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.

	Amount Borrowed					
	£30 000		£40 000		£50 000	
Period of loan	without payment protection	with payment protection	without payment protection	with payment protection	without payment protection	with payment protection
25 years	£243	£292	£325	£389	£406	£487
20 years	£262	£314	£349	£419	£437	£524
15 years	£297	£356	£396	£475	£495	£593
10 years	£373	£447	£498	£597	£622	£746

(*a*) Lucy borrows £40 000 over 15 years **without payment protection**. State her monthly payment.

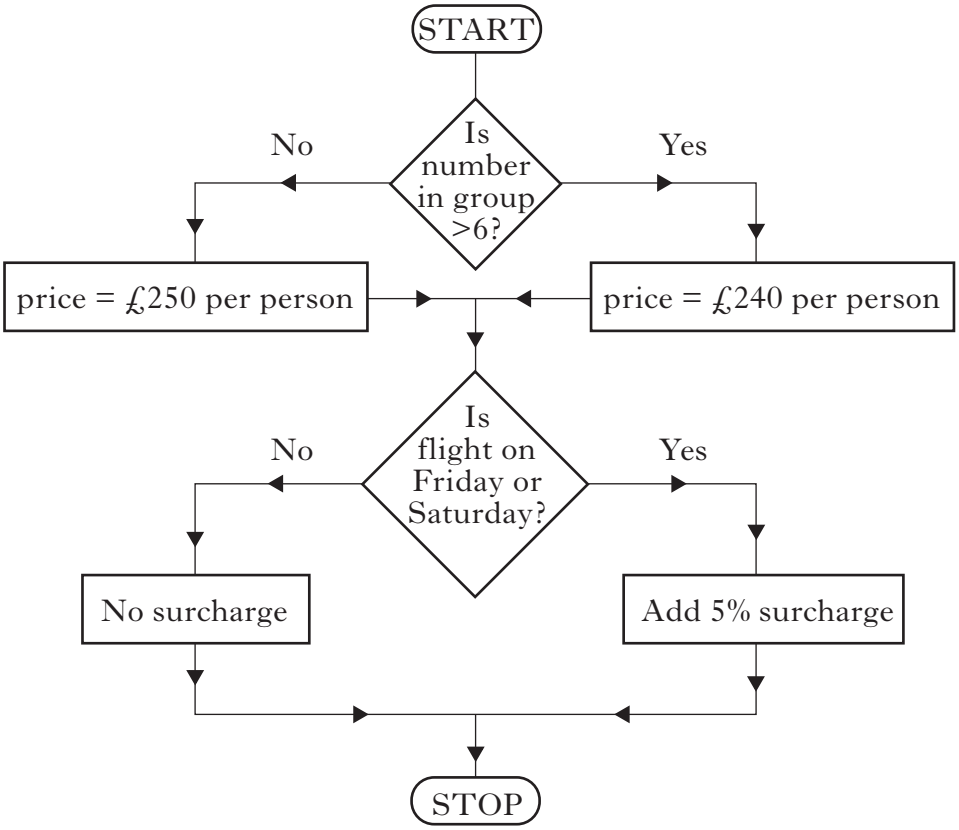
1

(*b*) Over the 15 years, how much **extra** would Lucy pay **in total** for payment protection on her loan of £40 000?

2

Marks

4. A group of people are booking flights to Munich.
This flowchart is used to calculate the total cost of the flights.
There are **8** people in the group. They want to fly on a **Friday**.



Calculate the **total** cost for these **8** people to fly to Munich on a **Friday**.

2

[Turn over

Marks

5. An estate agency recorded the prices of the houses they sold in April.
The prices varied from £125 000 to £250 000.
The prices are shown in the frequency table below.

Price (£ thousands)	Frequency	Price (£ thousands) × Frequency
125	5	625
150	8	1200
175	12	2100
200	7	
225	5	
250	3	
	Total = 40	Total =

Complete the frequency table **and** calculate the mean house price. **3**

Marks

6. Jamie is a cleaner.

He works Monday to Friday from 6 am until 8 am and from 3.30 pm until 6 pm.

His basic rate of pay is £6·80 per hour.

(*a*) Calculate his weekly wage.

2

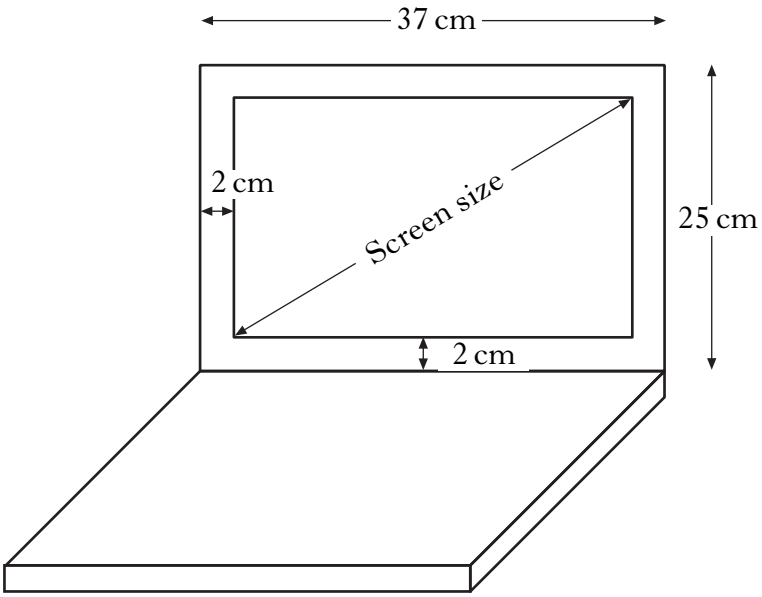
(*b*) Jamie was paid at time and a half for working one Saturday.
His wage for the day was £51.
How many hours did he work that day?

2

[Turn over

Marks

7. The screen size of a laptop computer is the length of the diagonal from one corner of the rectangular screen to its opposite corner.



This laptop measures 37 centimetres by 25 centimetres as shown.
The frame around the screen has a width of 2 centimetres.
Calculate the screen size of this laptop.
Do not use a scale drawing.

4

Marks

8. David bought a computer game in the United States for 50 dollars.
The same game cost £35 in Scotland.
The exchange rate was £1 = \$1·62.
How much did David save by buying the game in the United States?
Give your answer in pounds and pence.

3

9. Charlie invests £4200 in a bank account.
The rate of interest is 1·3% per annum.
Calculate the interest he should receive after 9 months.

3

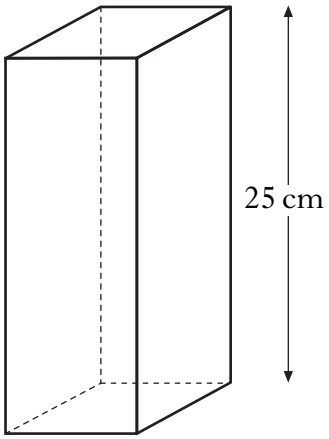
[Turn over

Marks

10. This cuboid has a square base.

Its height is 25 centimetres and its volume is 1369 cubic centimetres.

Calculate the length of its base.



3

11. Tony sells jewellery.

One day he earned £90 commission for selling jewellery worth £750.

Express Tony's commission as a percentage of his sales.

3

Marks

12. Two classes of fourteen pupils at Oakland Academy collected money for a local charity.

Listed below are the amounts (in £) collected by the pupils in class 5C.

27 26 17 27 18 21 23 19 18 27 24 20 31 28

(*a*) Find the median.

2

(*b*) Find the range.

1

(*c*) For class 5M the median was £10 and the range was £17.

Make **two** comments comparing the amounts collected by the pupils in class 5C and class 5M.

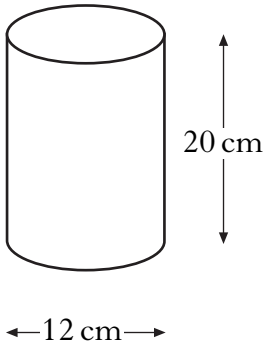
2

[Turn over

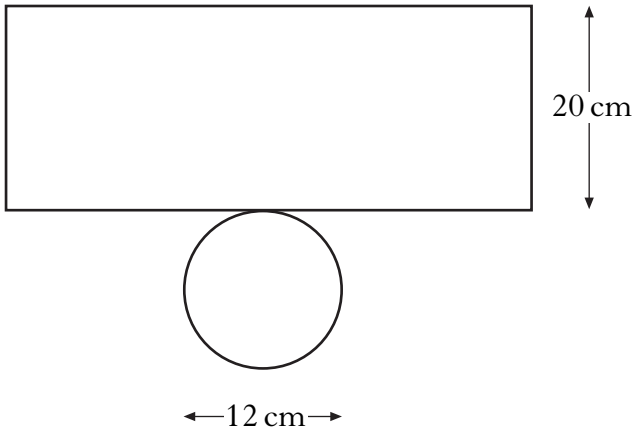
Marks

13. A plant container is in the shape of a cylinder with diameter 12 centimetres and height 20 centimetres.

The container is closed at the bottom and open at the top.



The diagram below shows the net of the container.

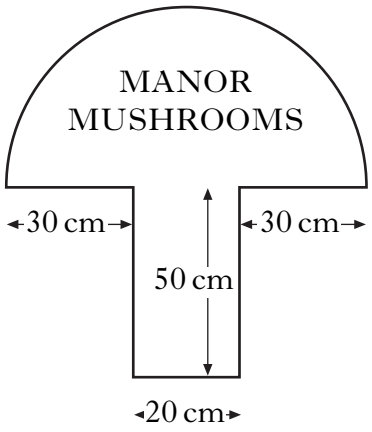


Calculate the **total** surface area of the container.

4

Marks

14. A sign for a mushroom farm consists of a semi-circle and a rectangle.



There is a red border painted all around the edge of the sign.
Calculate the total length of the red border.
Give your answer correct to the **nearest centimetre**.

5

[Turn over for Question 15 on *Page fourteen*

DO NOT WRITE IN THIS MARGIN

Marks

15. A box contains 3 red pencils and 12 green pencils.

(*a*) A pencil is taken from the box.
What is the probability that the pencil is red?
Give your answer as a fraction in its simplest form.

2

(*b*) The pencil is put back in the box.
More red pencils are then added to the box.
The probability of taking a red pencil is now $\frac{1}{3}$.
How many red pencils are now in the box?

2

[*END OF QUESTION PAPER*]

ADDITIONAL SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS