FOR OFFICIAL USE

Total Mark

X100/101

X100100 11

NATIONAL QUALIFICATIONS 2010

FRIDAY, 21 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.

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.

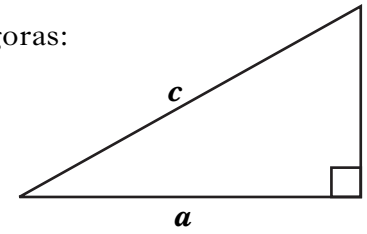
Use blue or black ink. Pencil may be used for graphs and diagrams only.

FORMULAE LIST

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

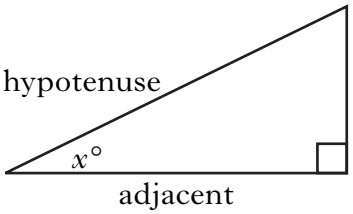
Area of a circle: $A = \pi r^2$

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

ALL questions should be attempted.

Marks

1. (*a*) Find 9·22 − 5·3.

1

(*b*) Find 528 ÷ 300.

1

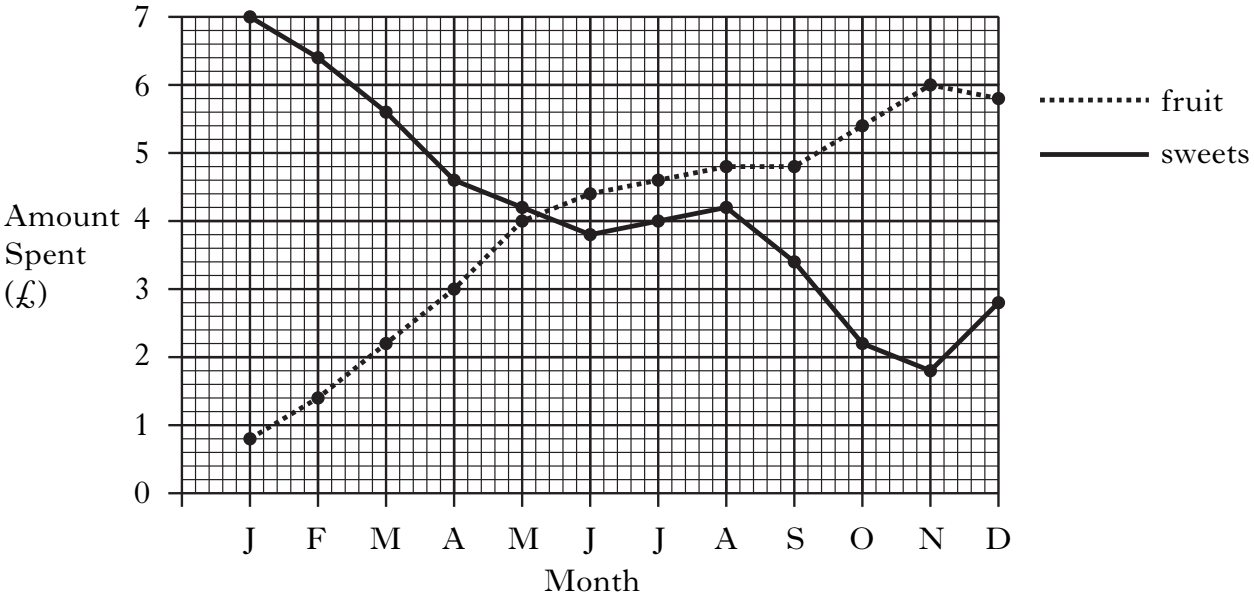
(*c*) Find 60% of 250.

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

DO NOT WRITE IN THIS MARGIN

Marks

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

$$22a + 5(4 - 3a).$$

2

(*b*) Factorise

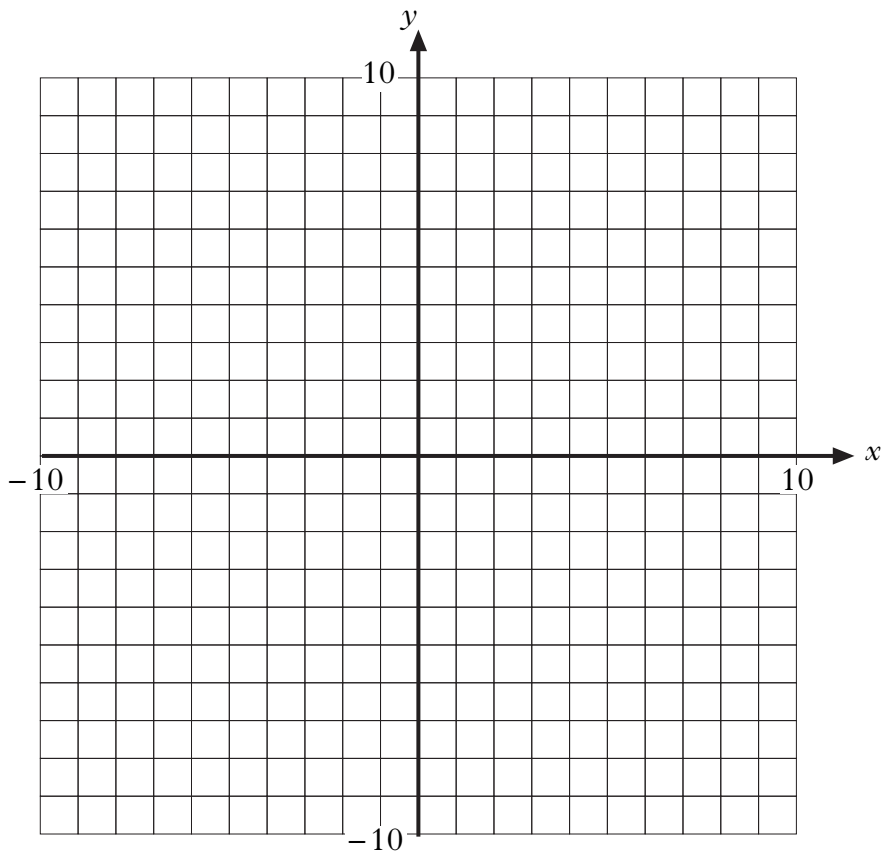
$$36 + 8n.$$

2

[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

7. Use the formula below to find the value of h when t = 3.

$$h = 20 - 4t^2$$

3

DO NOT WRITE IN THIS MARGIN

Marks

8. Solve algebraically the equation

$$3t + 60 = 11t + 4.$$

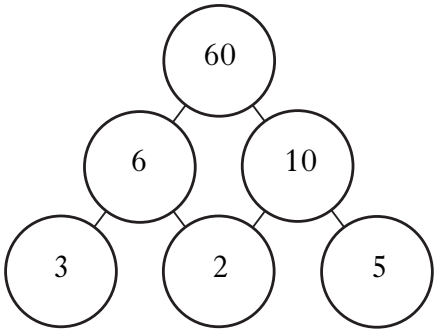
3

[Turn over for Question 9 on *Page ten*

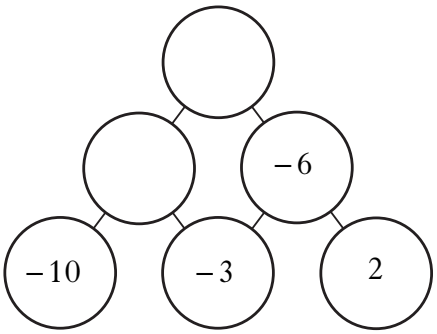
Marks

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.

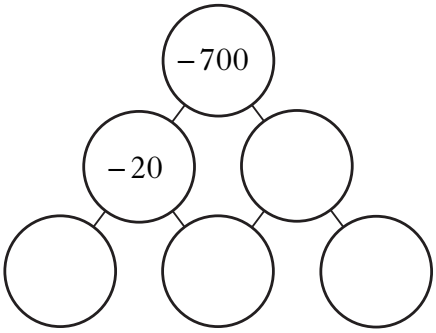


(*a*) Use the rules to complete this number pyramid.



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

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

FOR OFFICIAL USE

Total Mark

X100/103

X1001002 1

NATIONAL QUALIFICATIONS 2010

FRIDAY, 21 MAY
1.55 PM – 2.50 PM

MATHEMATICS
INTERMEDIATE 1
Units 1, 2 and 3
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.

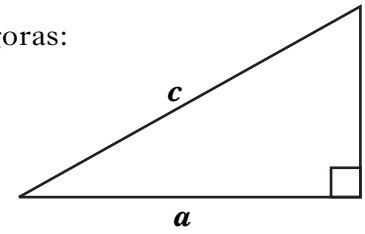
Use blue or black ink. Pencil may be used for graphs and diagrams only.

FORMULAE LIST

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

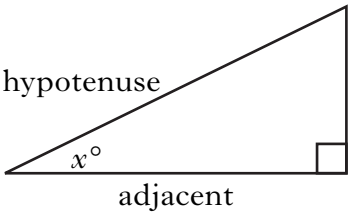
Area of a circle: $A = \pi r^2$

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

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

3. A stack of 500 sheets of paper is 45 millimetres thick.
Calculate the thickness of one sheet.
Give your answer in standard form.

3

Marks

4. Solve algebraically the inequality

$$5x - 12 > 53.$$

2

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. (*a*) Complete the table below for $y = \frac{1}{3}x + 2$.

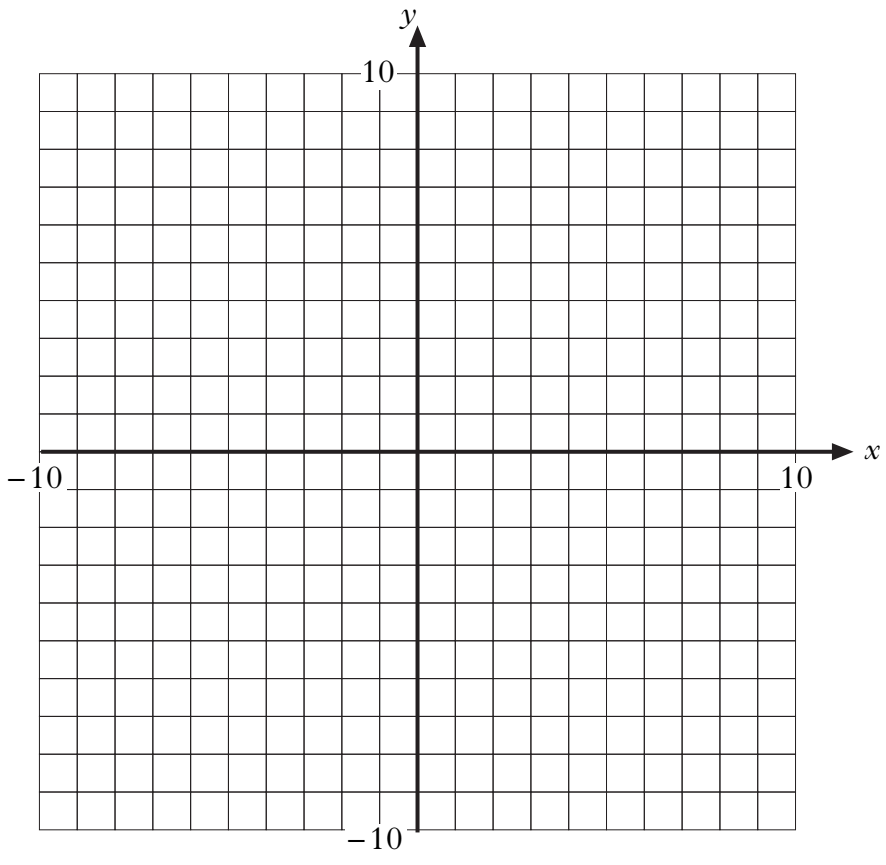
x	–9	0	6
y			

2

(*b*) Draw these two lines on the grid:

(i) $y = \frac{1}{3}x + 2$; **2**

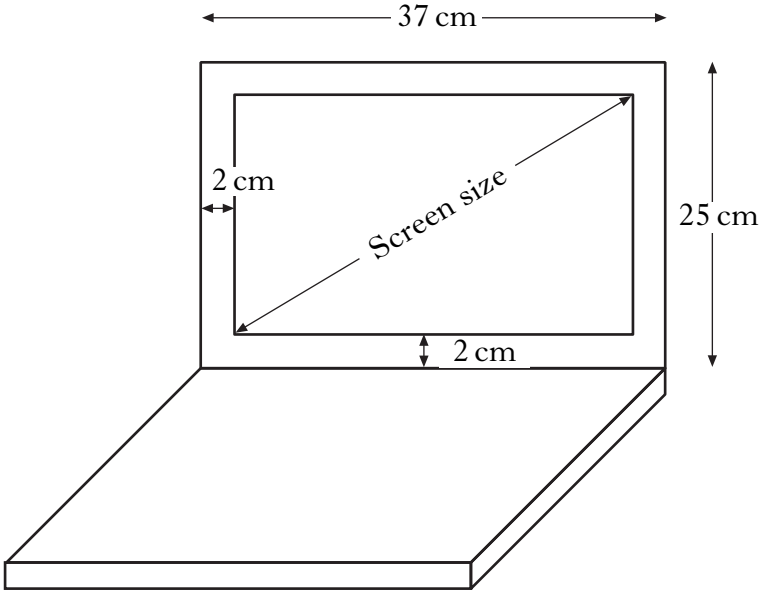
(ii) $x = 4$. **1**



[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

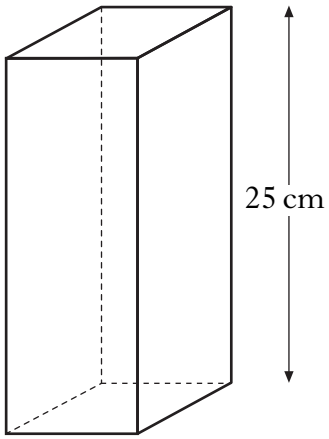
[Turn over

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

DO NOT WRITE IN THIS MARGIN

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.

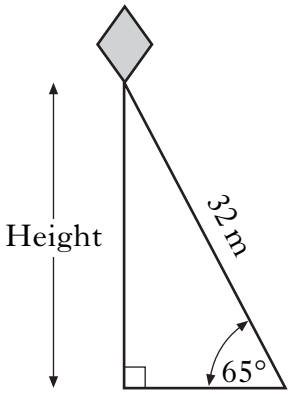
Make **two** comments comparing the amounts collected by the pupils in class 5C and class 5M.

2

[Turn over

Marks

13. Kate is flying a kite.
She lets out 32 metres of string, pulled tight, at 65° to the ground.

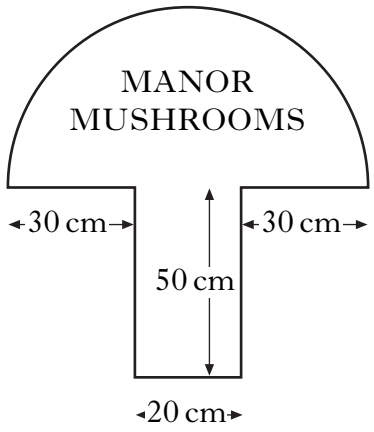


Calculate the height of the kite as shown in the diagram.
Do not use a scale drawing.

3

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 twelve*

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*]

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

[BLANK PAGE]