Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

AQA

Level 1/Level 2 Certificate
Foundation Level
June 2015

Use of Mathematics 43503F

Core unit

Monday 18 May 2015 9.00 am to 10.15 am

For this paper you must have:
- a clean copy of the Data Sheet (enclosed)
- a calculator
- a pair of compasses
- a protractor
- a ruler.

Time allowed
- 1 hour 15 minutes

Instructions
- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- You may **not** refer to the copy of the Data Sheet that was available prior to this examination. A clean copy is enclosed for your use.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 50.
- You are expected to use a calculator where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

Section A

Answer **all** questions.

Answer each question in the space provided for that question.

Use **Road signs and road safety** *on page 2 of the Data Sheet.*

1 (a) A road sign is shown.

What is the mathematical name of the shape of this sign?

[1 mark]

Answer .....

1 (b) (i) The road sign below is modelled by an equilateral triangle.

The perimeter of this sign is 210 cm.

What is the length of one side of this sign?

[2 marks]

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Answer ..... cm

1 (b) (ii) Another triangular road sign is shown.

This road sign is **congruent** to the sign in part **(b)(i)**.

What is the perimeter of this road sign?

[1 mark]

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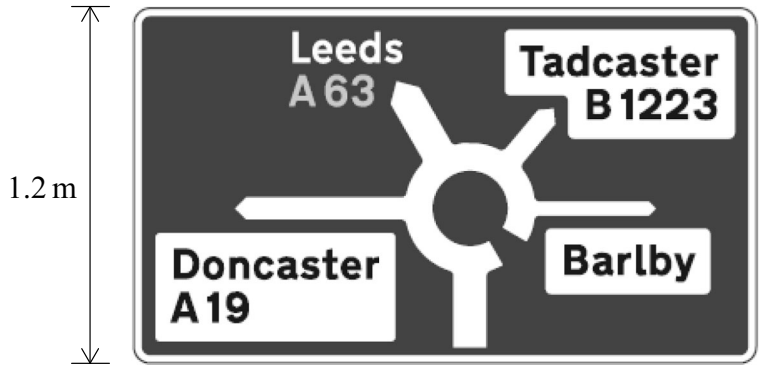
Answer ..... cm

Question 1 continues on the next page

1 (c) A road sign modelled by a rectangle is shown.



Not to scale

The width of the sign is twice its height.
The height of the sign is 1.2 metres.

1 (c) (i) Write down the width of the road sign and hence calculate its perimeter.

[2 marks]

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Width = ... m

Perimeter = ... m

1 (c) (ii) Calculate the area of the road sign.
Give the units of your answer.

[3 marks]

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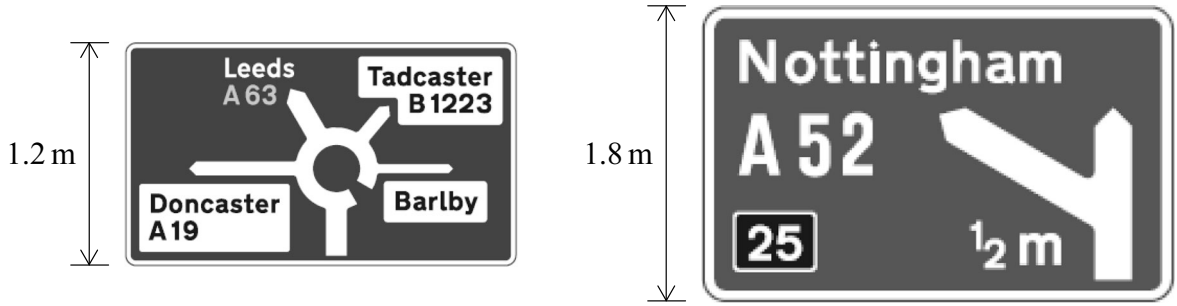
Answer .....

1 (d) Two road signs modelled by rectangles are similar in shape.
The smaller sign is 1.2 metres high.
The larger sign is 1.8 metres high.

Not to scale



What is the scale factor of enlargement from the small sign to the large sign?
[2 marks]

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Answer .....

11

Turn over for the next question

Section B

Answer **all** questions.

Answer each question in the space provided for that question.

Use **Food recipes** *on page 3 of the Data Sheet.*

2 (a) The total weight of all the ingredients is 1430 grams.

2 (a) (i) Change 1430 grams into kilograms.

[1 mark]

Answer ..... kg

2 (a) (ii) What **fraction** of the total weight of ingredients makes up the **filling**?

[2 marks]

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Answer .....

2 (a) (iii) What **percentage** of the **total** weight of ingredients is butter?

[3 marks]

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Answer ..... %

2 (b) In the filling, what is the ratio of the weight of apples to the weight of blackberries?
Give your answer in its lowest terms.

[2 marks]

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Answer .....

2 (c) The recipe shows the amount of ingredients that you need to make a blackberry and apple crumble for 6 people.
Rashida is making a blackberry and apple crumble for 9 people.

What weight of apples should she use for the filling?

[2 marks]

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Answer ..... grams

10

Turn over for the next question

Section C

Answer **all** questions.

Answer each question in the space provided for that question.

Use **Air temperature** *on pages 4 and 5 of the Data Sheet.*

3 (a) The table shows the highest and lowest temperatures for every day of one week in March 2013 in Glasgow.

	Glasgow	
Day	**Lowest temperature (°C)**	**Highest temperature (°C)**
Sunday	5	8
Monday	−1	8
Tuesday	−3	9
Wednesday	3	6
Thursday	5	7
Friday	4	5
Saturday	2	4

3 (a) (i) On what day was the lowest temperature of the week recorded?

[1 mark]

Answer .....

3 (a) (ii) What was the difference between the highest and lowest temperatures in Glasgow on **Monday**?

[1 mark]

.....

.....

Answer ..... °C

3 (a) (iii) Calculate the mean of the **highest** temperatures for the week.
Give your answer correct to one decimal place.

[4 marks]

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Answer ..... °C

3 (a) (iv) What was the mode of the **highest** temperatures for this week?

[1 mark]

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Answer ..... °C

3 (b) The highest daily temperatures in Glasgow were recorded for the months of March 2012 and March 2013.
The table shows the mean and range of the highest daily temperatures.

	Highest daily temperature	
	Mean (°C)	**Range (°C)**
March 2012	13.6	13
March 2013	8.6	11

Explain what the differences in the means and ranges tell you about the temperatures in March 2012 compared with those in March 2013.

[2 marks]

Mean.....

.....

Range .....

.....

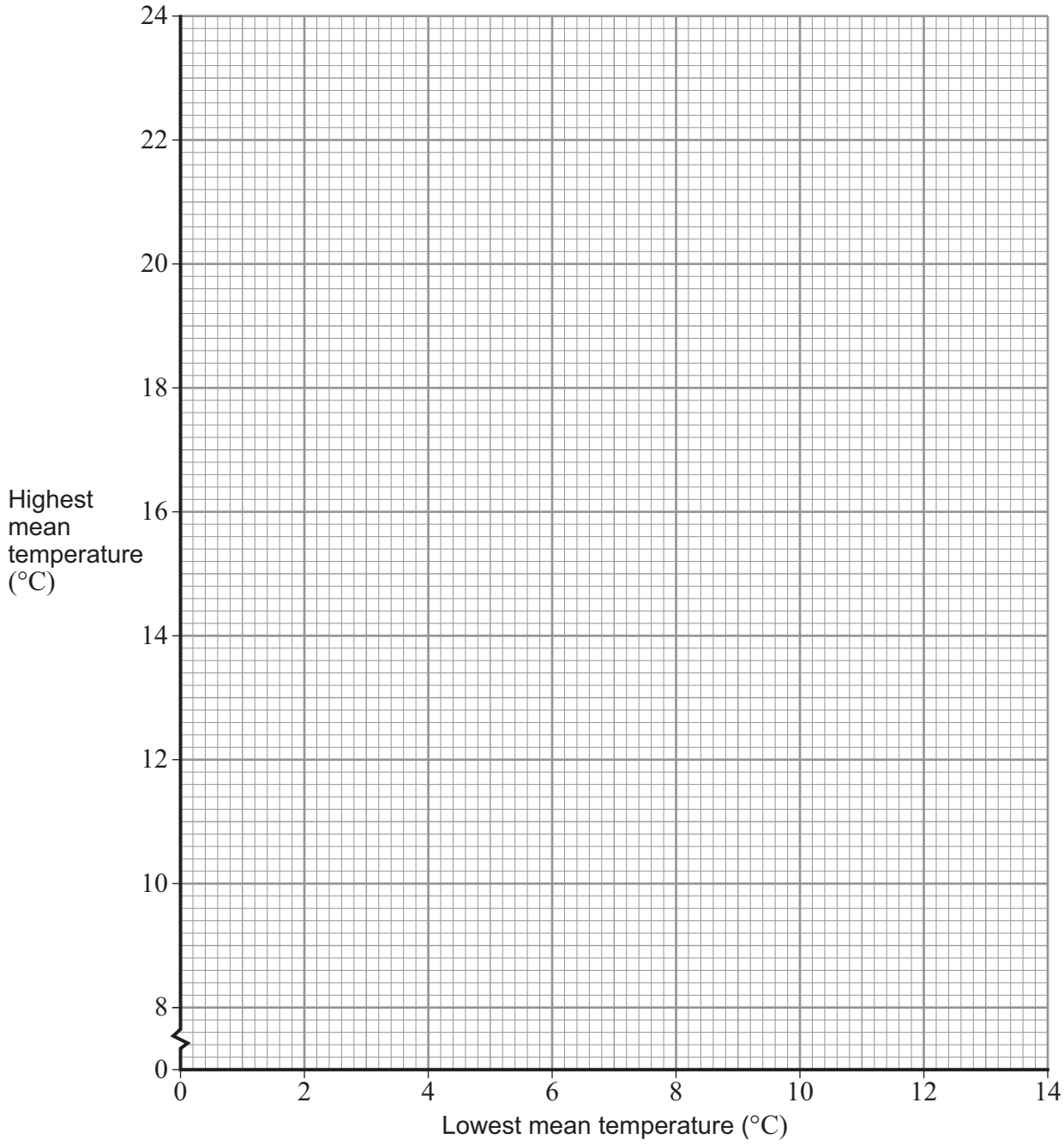
Question 3 continues on the next page

3 (c) Over the thirty-year period from 1981 to 2010, the lowest and highest mean monthly temperatures for London were recorded. The table below shows these data for the months from March to August.

	London	
Month	**Lowest mean temperature (°C)**	**Highest mean temperature (°C)**
March	4.6	11.6
April	5.9	14.6
May	8.9	18.1
June	11.8	21.0
July	13.7	23.4
August	13.8	23.1

3 (c) (i) Plot a scatter diagram on the graph paper opposite for the months from March to August.

[2 marks]



3 (c) (ii) Draw a circle around the type of correlation shown by the scatter diagram.

[1 mark]

no correlation negative correlation positive correlation

3 (c) (iii) Draw a line of best fit on the scatter diagram.

[1 mark]

3 (c) (iv) Use your line of best fit to estimate the highest mean temperature in London in a month when the lowest mean temperature was 8 °C.

[1 mark]

Answer ..... °C

14

4 Temperatures in degrees Celsius, C, and in degrees Fahrenheit, F, are connected by the formula

$$F = \frac{9}{5}C + 32$$

Find the value of F when $C = 25$.

[3 marks]

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Answer .....

3

5 (a) Mary says that the temperature indoors is 10 degrees higher than the temperature outdoors.

Write an algebraic expression for the temperature indoors when the temperature outdoors is t degrees.

[1 mark]

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Answer ..... degrees

5 (b) Julian says that the temperature indoors is three times the temperature outdoors.

Write another algebraic expression for the temperature indoors when the temperature outdoors is t degrees.

[1 mark]

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Answer ..... degrees

5 (c) Use your answers to parts **(a)** and **(b)** to form an equation in t.
Solve your equation to find the temperature outdoors.

[3 marks]

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Answer ..... degrees

5

Turn over for the next question

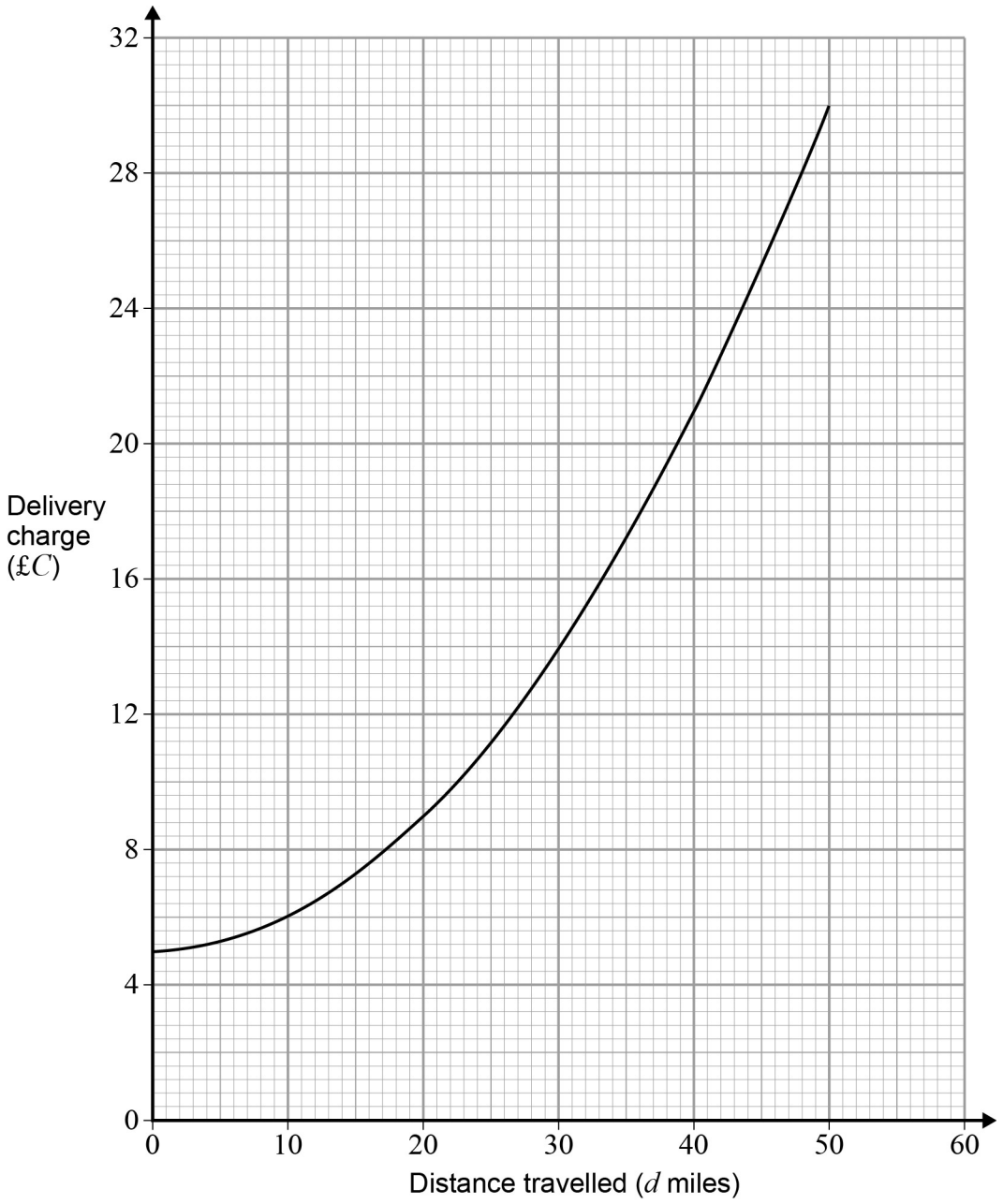
Section D

Answer **all** questions.

Answer each question in the space provided for that question.

Use **Delivery charges** *on page 6 of the Data Sheet.*

6 The delivery charges, £C, made by 'Fast Couriers' up to a distance of 50 miles are shown by the graph.



6 (a) (i) What is the fixed cost used by Fast Couriers?

[1 mark]

Answer £ .....

6 (a) (ii) Use the graph to find the delivery charge when the distance travelled is 30 miles.

[1 mark]

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Answer £ .....

6 (b) Another courier service, 'Expert Couriers', calculates charges using the formula

$$C = \frac{1}{3}d + 6$$

where C is the cost, in £, and d is the distance travelled in miles.

6 (b) (i) On the grid opposite, which shows Fast Couriers' costs, draw an accurate graph of

$$C = \frac{1}{3}d + 6$$

for values of d from 0 to 60.

[4 marks]

Space for working

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6 (b) (ii) Use the two graphs to find the value of d for which Expert Couriers' charges are the same as Fast Couriers' charges.

[1 mark]

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Answer ..... miles

7

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED