For **AQA**

Name	Class

GCSE
Mathematics Specification

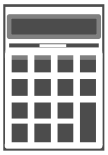
F

Paper 3 Foundation Tier

Churchill Paper 3E

1 hour 30 minutes

Materials

For this paper you must have:	
• a calculator • mathematical instruments	

Instructions

- Use black ink or black ball-point pen.
- Draw diagrams in pencil.
- Write your name and class in the box at the top of the page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.

Churchill Maths

Written by Shaun Armstrong

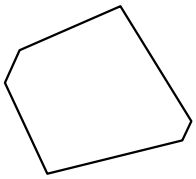
Answer **all** questions in the spaces provided.

1 Which of these shapes is **not** a hexagon?

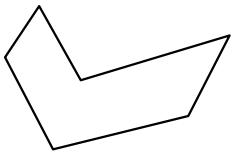
Circle the correct letter.

[1 mark]

A



B



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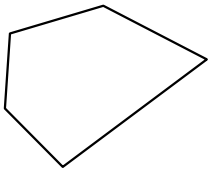

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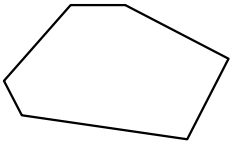


2 Which of these numbers is a square number **and** a cube number?

Circle your answer.

[1 mark]

8 16 64 81

3 How many of these fractions are **larger** than $\frac{2}{3}$?

$\frac{1}{2}$ $\frac{11}{15}$ $\frac{5}{9}$

Circle your answer.

[1 mark]

0 1 2 3

4 A bag contains 6 pink balls and 8 green balls.

Work out the smallest number of balls you can remove from the bag so that the ratio of pink balls to green balls is 1 : 2

Circle your answer.

[1 mark]

2 3 5 7

5 (a) $\frac{1}{5}$ of the coins in a pot are gold-coloured.
The rest of the coins in the pot are silver-coloured.

Write down the ratio of gold-coloured to silver-coloured coins in the pot.

[1 mark]

Answer _____ : _____

5 (b) 35% of the bottles in a wine rack contain white wine.
The rest of the bottles contain red wine.

Find the ratio of white wine bottles to red wine bottles in the rack.
Give your ratio in its simplest form.

[2 marks]

Answer _____ : _____

6 (a) Solve $5m = 12$

[1 mark]

Answer _____

6 (b) Simplify $5y - 2 + y + 3$

[2 marks]

Answer _____

6 (c) Find the value of $2a - b$ when $a = 1.5$ and $b = -3$

[2 marks]

Answer _____

6 (d) Make p the subject of the formula

$$r = \frac{1}{2}p + q$$

[2 marks]

Answer _____

7 This is a florist's price list for weddings.

Normal bouquet	£27
Special bouquet	£45
Corsage	£3.50
Table arrangement	£12

10% discount when you spend over £400

Louisa plans to order 6 normal bouquets, 2 special bouquets, 9 corsages and 8 table arrangements.

Fatat says

"If you order one extra normal bouquet you'll pay less in total."

Is Fatat correct?

You must justify your answer.

[5 marks]

Answer _____

8 Mike has two dice with coloured sides.

The first dice has 2 red sides, 2 yellow sides and 2 white sides.
The second dice has 1 blue side, 2 green sides and 3 purple sides.

Mike rolls the two dice.

8 (a) List all the possible outcomes.

One has been done for you.

[2 marks]

First Dice	Second Dice
Red	Blue

Simone says

"The chance of rolling red on the first dice and blue on the second dice is $\frac{1}{9}$."

8 (b) Explain why Simone is wrong.

[1 mark]

9

The graph shows Will's speed during and just after a race.

9 (a) What was Will's highest speed during the race.

[1 mark]

Answer _____ m/s

9 (b) Work out how far Will ran during the 5th minute of the race.

[2 marks]

Answer _____ m

9 (c) After how many minutes did Will finish the race?

Explain how you can tell this from the graph.

[2 marks]

_____ minutes _____

10 (a) Use your calculator to work out

$$\frac{3.2 \times 4.9}{3 - \sqrt{6}}$$

giving your answer correct to 1 decimal place.

[2 marks]

Answer _____

10 (b) Using your calculator, find the values of x and y such that

$$6860 = 2^x \times 5 \times 7^y$$

[2 marks]

x = _____

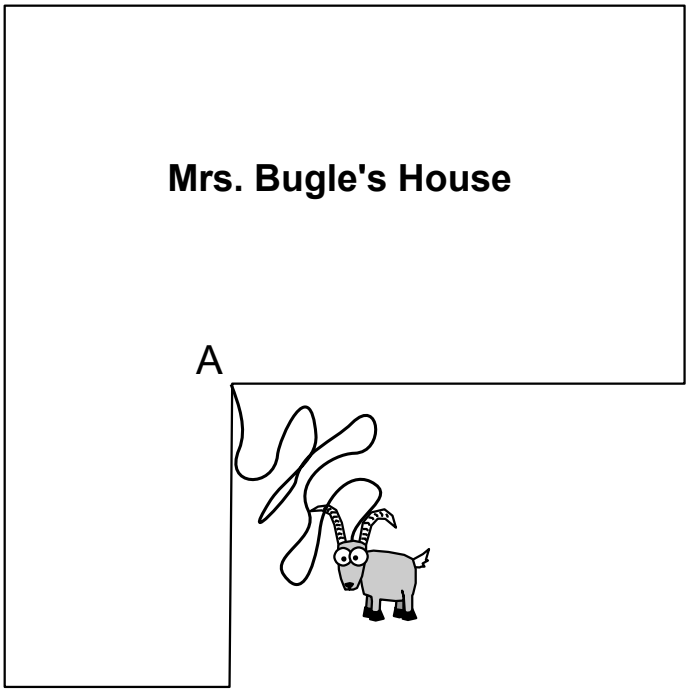
y = _____

10 (c) Hence, or otherwise, find the Highest Common Factor (HCF) of 294 and 6860.

[2 marks]

Answer _____

11



Scale: 1 : 100

The map shows Mrs Bugle's house using a scale of 1 : 100

Mrs. Bugle owns a goat called Billy.
There is grass all around the house which Billy likes to graze on.
However, he is tethered to the corner of the house labelled A by a 10 metre long rope.

Construct the region of grass that Billy is able to reach.

[4 marks]

12 Rosa looked at the 30 houses for sale in the window of an estate agents.
This table shows how many bedrooms each one had.

Number of bedrooms	Frequency
1	2
2	9
3	12
4	5
5	2

12 (a) Calculate the mean number of bedrooms in these houses.

[3 marks]

Answer _____

The estate agents have another 318 houses for sale.

12 (b) Calculate an estimate for the number of these houses that have 4 bedrooms.

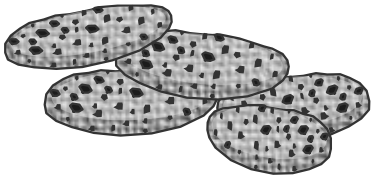
[2 marks]

Answer _____

12 (c) State an assumption you have made in your calculation in part **(b)**.

[1 mark]

13 Here are the ingredients for a recipe to make 30 cookies.



225 g butter
110 g caster sugar
270 g plain flour
85 g chocolate chips

13 (a) Circle the weight of the raw ingredients in one cookie.

[1 mark]

15g 17g 19g 23g

13 (b) Jack has 180 g of plain flour and plenty of the other ingredients.

Circle the number of cookies that Jack could make.

[1 mark]

15 18 20 24

Here are the prices for the cookie ingredients in Jill's local supermarket.

Butter	85 p for 250 g
Caster sugar	£2.45 for 2 kg
Plain flour	£1 for 1.5 kg
Chocolate chips	80 p for 100 g

13 (c) Jill is going to make cookies every week. That means she will never waste any of the ingredients that she buys.

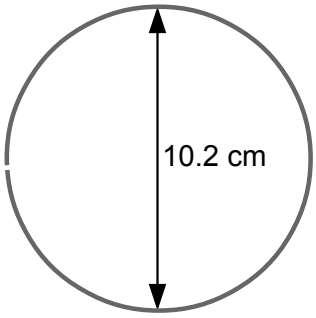
Work out how much the ingredients cost Jill for each cookie she makes.

Give your answer in pence to 1 decimal place.

[3 marks]

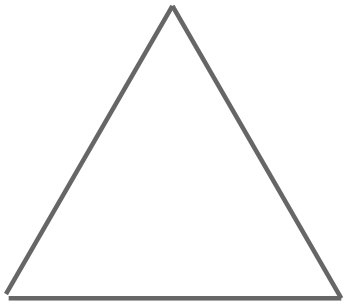
Answer _____ pence

14 A piece of wire is in the shape of a circle of diameter 10.2 cm.



Not drawn accurately

The wire is straightened and then formed into the shape of an equilateral triangle.



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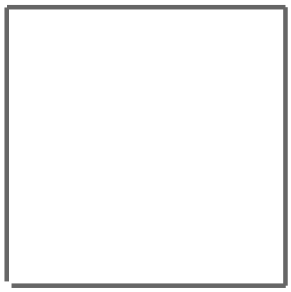
14 (a) Work out the side length of the triangle.

[3 marks]

Answer _____ cm

Next the wire is formed into the shape of a square.



Not drawn accurately

14 (b) Work out the area of the square.

[2 marks]

Answer _____ cm^2

15 70% of the animals that visit a pet grooming salon are dogs.

75% of the dogs that visit come back within one month.

40% of the other animals that visit come back within one month.

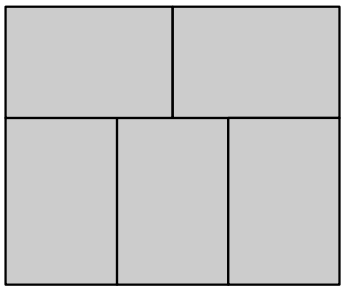
Circle the percentage of all the animals that visit the salon that come back within one month.

[1 mark]

55.5% 64.5% 65.5% 67.5%

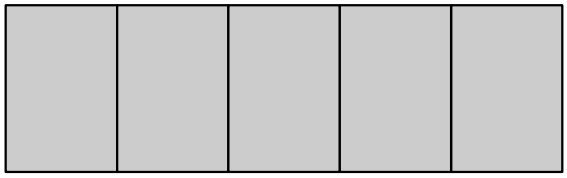
16 Bobby is playing with plastic rectangles.
Each rectangle measures 6 cm by 4 cm.

He takes 5 of the rectangles and arranges them into a larger rectangle like this.



Not drawn accurately

Bobby then moves two of the rectangles to make a different large rectangle like this.



The two larger rectangles have different perimeters.

Work out the percentage change in the perimeter as a result of the change Bobby made.

State clearly whether the change is an increase or decrease.

[3 marks]

Answer _____ %

17 Circle the area that is the same as 20 cm^2

[1 mark]

0.2 m^2 0.02 m^2 0.002 m^2 0.0002 m^2

18 75 students from Year 10 and Year 11 go on a camping trip.

33 of the students are in Year 11.
37 of the students are boys.
13 of the students are boys are in Year 11.

One of the students is chosen at random to be camp leader.

Work out the probability that the student is a Year 10 girl.

[3 marks]

Answer _____

19 Three friends, Ayyub, Bran and Curtis, each have some mini chocolate eggs.

Bran has 1 more egg than Ayyub.
Curtis has 50% more eggs than Bran.

Altogether, Ayyub, Bran and Curtis have 48 chocolate eggs.

Curtis gives eggs to each of Ayyub and Bran so that they all have the same number of eggs.

Work out how many eggs Curtis gives away in total.

[4 marks]

Answer _____

20 (a) Factorise $p^2 - 16$

[2 marks]

Answer _____

20 (b) Solve $t^2 + 2t - 8 = 0$

[3 marks]

Answer _____

21 250 people entered a theme park while Joan was on the gate.

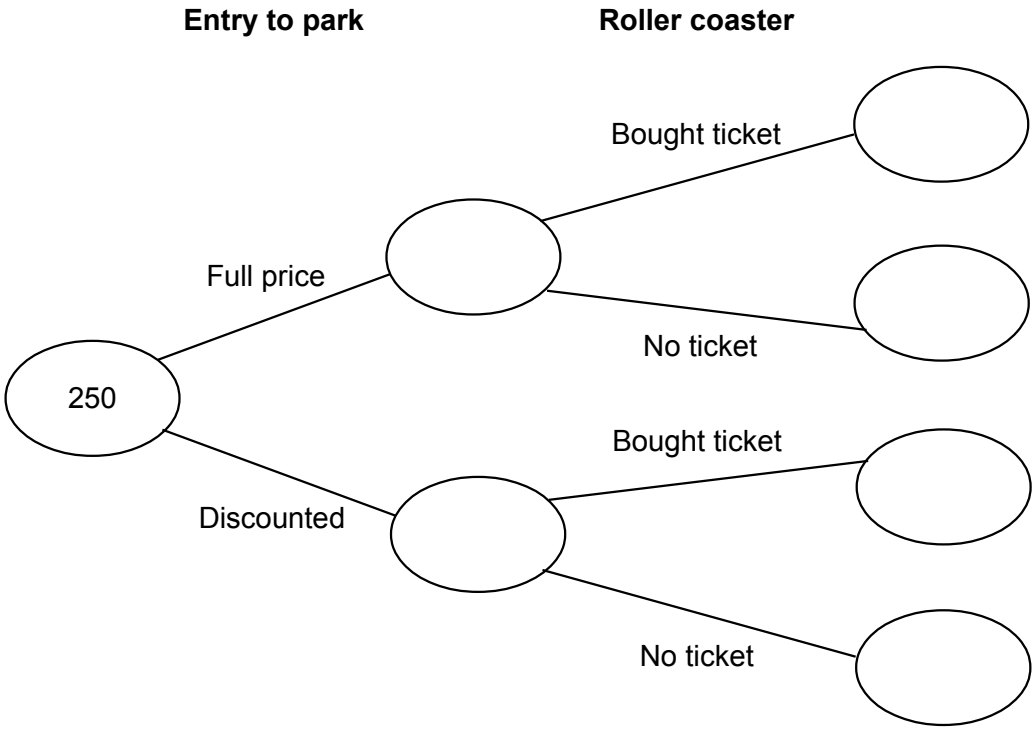
60% of these people paid full price to enter the park.

$\frac{2}{3}$ of those who paid full price also bought a ticket for the roller coaster.

80% of those who bought a ticket for the roller coaster had paid full price to enter the park.

Complete this frequency tree.

[4 marks]



22 In a TV gameshow, a contestant starts with a pot of money containing £8000.
The contestant has to complete a task to win some or all of this money.

If the contestant completes the task in less than a minute, they keep all £8000.
After each full minute spent doing the task, the money in the pot decreases by 20%.

22 (a) James says

"If they take longer than 5 minutes they don't win any money."

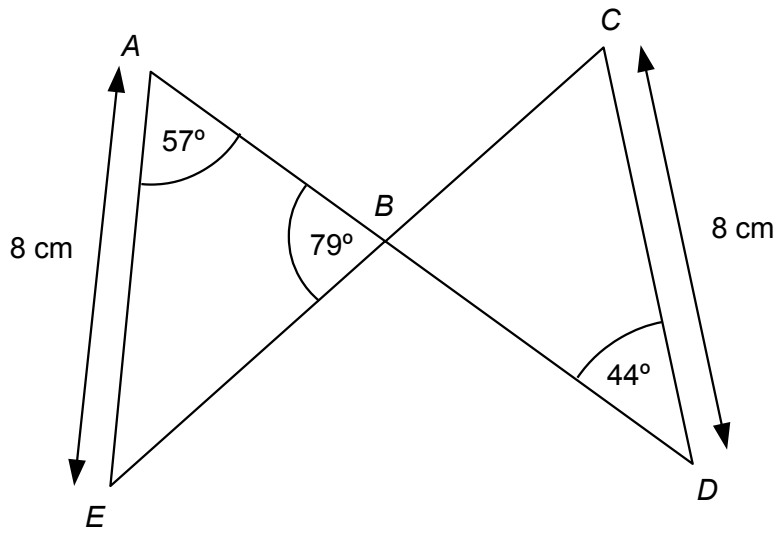
Explain why James is not correct.

[1 mark]

22 (b) Show that a contestant who completes the task in 2 minutes and 21 seconds wins £5120.

[2 marks]

23



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The straight lines *AD* and *CE* intersect at the point *B*.

Use the information on the diagram to prove that triangles *ABE* and *CBD* are congruent.

[3 marks]

END OF QUESTIONS