AQA

.CG Maths.
Hints

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

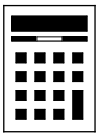
F

Foundation Tier Paper 3 Calculator

Tuesday 13 June 2017 Morning Time allowed: 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.
- 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.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
TOTAL	

Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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Answer **all** questions in the spaces provided

1 Circle the lowest of these temperatures.

[1 mark]

–4.9°C 0°C –7°C 0.1°C

Most negative or least positive temperature.

2 Circle the expression that is four times bigger than n.

When n = 2...

[1 mark]

$n + 4$ $4n$ $\frac{n}{4}$ n^4

2 + 4 4 x 2 2/4 2^4

Which is 4 times bigger than 2?

3 Circle the fraction **greater** than $\frac{3}{10}$ = 0.3

[1 mark]

$\frac{1}{3}$ $\frac{3}{11}$ $\frac{4}{15}$ $\frac{29}{100}$

Convert into decimals and compare to 0.3

To convert to a decimal, enter into the calculator and press the SD button

4 Circle the value of 2^5

[1 mark]

10 25 32 64

Type into calculator

5 (a) Simplify $a \times a \times a + b + b$

[2 marks]

Multiplying multiple times can be expressed as a power.
Repeated addition can be expressed as multiplication.

Answer _____

5 (b) Simplify $5(x + 3) - x + 2$

[3 marks]

Expand the bracket then collect like terms

Answer _____

Turn over for the next question

9

6 Twelve cards numbered 1 to 12 are put into six pairs.

Each pair has a total.

Complete the table to show the pairs and their totals.

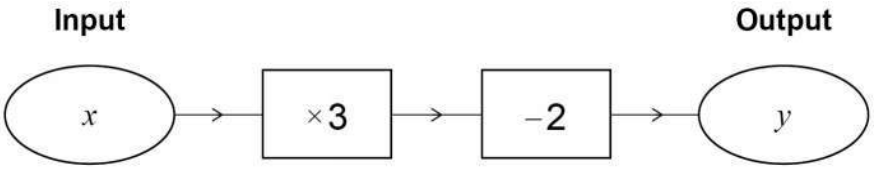
[4 marks]

Cards	Total
1 and 2	3
_____ and _____	9
_____ and _____	11
_____ and _____	14
_____ and _____	19
_____ and _____	22

Start with the highest as these are the hardest to make.

Careful not to repeat any numbers.

7 Here is a number machine.



7 (a) Work out the output when the input is 4

[1 mark]

4 X 3 − 2

Answer _____

7 (b) Work out the output when the input is –4

[1 mark]

−4 X 3 − 2

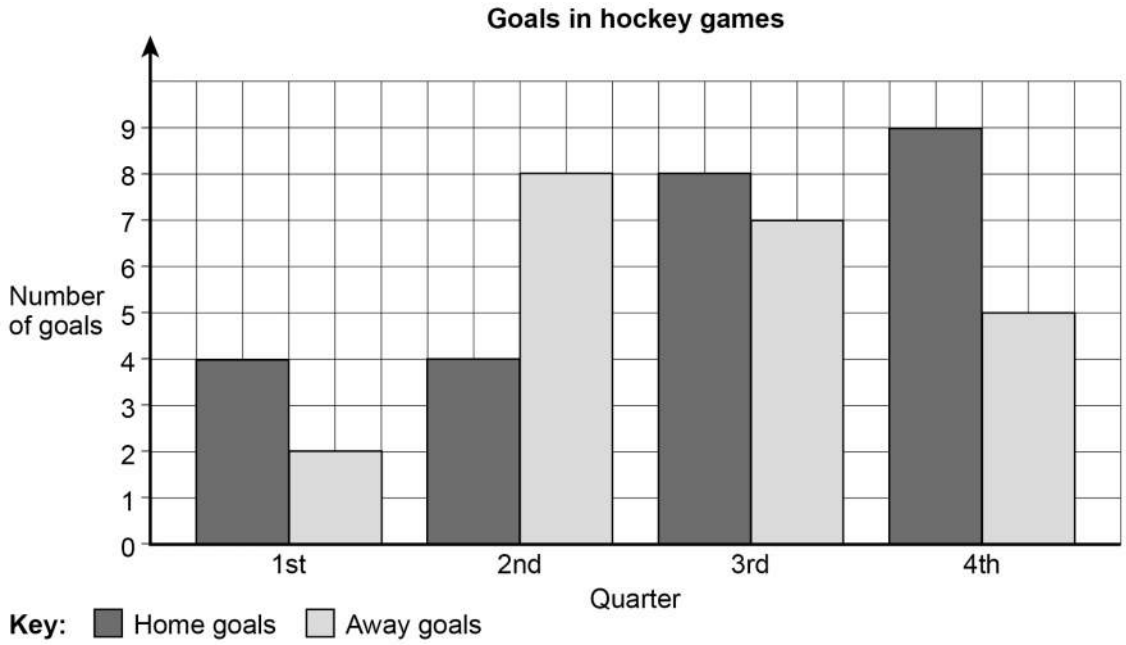
Answer _____

Turn over for the next question

6

8 Here is information about the goals scored in some hockey games.

Each game has four quarters.



8 (a) Which quarter was the mode for **away** goals?

Circle your answer.

[1 mark]

1st 2nd 3rd 4th

Most frequent. Be careful of the key.

8 (b) There were 10 games.

Work out the mean number of goals per game.

[2 marks]

Total goals / Number of games

Answer _____

8 (c) In total, how many **more** home goals were scored than away goals?

[2 marks]

Add up the home goals and the away goals. Then calculate the difference.

Answer _____

8 (d) Rob says,

"More home teams **must** have won because there were more home goals."

Is he correct?

Give a reason for your answer.

[1 mark]

There were 10 games and we are only given the data for all of the games combined.

6

9 (a) List **all** the factors of 30

[2 marks]

It's easiest to think of factors in pairs and starting with the lowest factors. 2 x 6 = 12 so 2 and 6 are factors of 12

Answer _____

9 (b) A factor of 30 is chosen at random.

What is the probability that it is a 2-digit number?

[1 mark]

$$\frac{\text{Number of 2-digit factors}}{\text{Total number of factors}}$$

Answer _____

10 Each shape below has an area of 24 cm^2

Complete the missing lengths.

[3 marks]

Area of rectangle = base x height

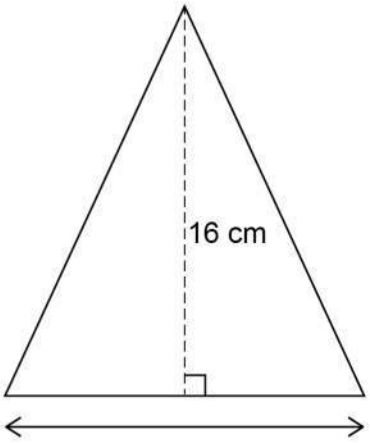
Rectangle

_____ cm

Area of triangle = 1/2 x base x height

Not drawn accurately

Triangle



_____ cm

Turn over for the next question

6

11 A television channel shows 12 minutes of adverts in each half hour.

How many **minutes** of adverts does it show from 5 am to 11 pm?

[3 marks]

Work out how many hours are between 5am to 11pm, then how many half hours. There are 2 half hours every hour. There are 12 minutes for every half hour.

Answer _____ minutes

12 Put these probabilities in order, starting with the least likely.

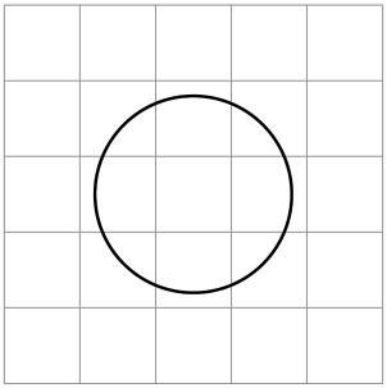
44% $\frac{1}{4}$ 0.404 $\frac{4}{10}$

[2 marks]

Convert all into decimals to make it easier to compare. The smallest numbers are least likely.

Answer _____ , _____ , _____ , _____

13 A circle is drawn on a centimetre grid.



13 (a) Draw a tangent to the circle.

Any straight line which just touches but doesn't cross the circle regardless of how long it is extended

[1 mark]

13 (b) Grace works out that the area of the circle is more than $9\ cm^2$

Why must this be wrong?

9 squares on the diagram

[1 mark]

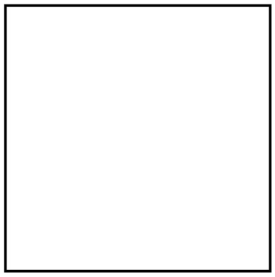
Turn over for the next question

7

14 (a) The front elevation, side elevation and plan of a solid are all the same, as shown.

3D shape.

Plan: a 2D representation as viewed from above.
Elevations: 2D representations as viewed from the sides.

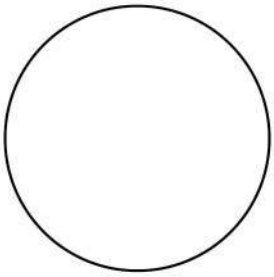


Write down the name of the solid.

[1 mark]

Answer _____

14 (b) The front elevation, side elevation and plan of a solid are all the same, as shown.



What 3D shape looks like a circle from all directions?

Write down the name of the solid.

[1 mark]

Answer _____

15 Show that there are **exactly** five 3-digit cube numbers.

[3 marks]

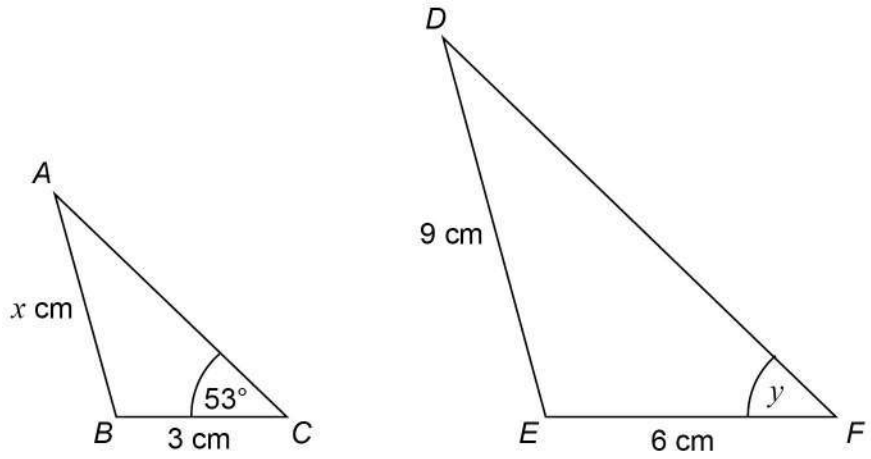
Cube numbers are the result of cubing a whole number. Use a calculator to find the 3-digit cube numbers. Also show the last 2-digit cube and first 4-digit cube to show there aren't any more 3-digit ones.

Turn over for the next question

5

16 Triangles *ABC* and *DEF* are similar.

Not drawn accurately



16 (a) Work out the value of x.

[2 marks]

DEF is a scaled up version of *ABC* and all the sides keep the same proportion. Work out the scale factor. All sides have been multiplied by the same factor.

Answer _____

16 (b) Write down the size of angle y.

The angles in similar shapes are the same.

[1 mark]

Answer _____ degrees

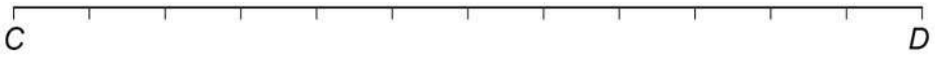
17 *CD* and *PQ* are lines of length 12 cm

17 (a) *CE* : *CD* = 1 : 2

Mark point *E* on the line with a cross.

CD is twice as far as *CE*. So *CE* must be half of the distance *CD*.

[1 mark]

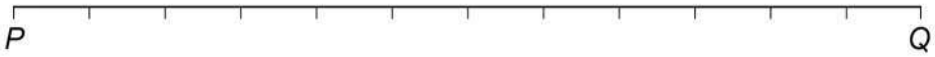


17 (b) *PR* : *RQ* = 1 : 3

Mark point *R* on the line with a cross.

PR is 1 part, *RQ* is 3 parts so *PQ* must be 4 parts.

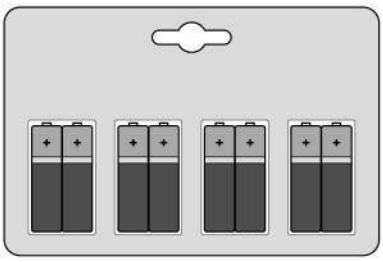
[1 mark]



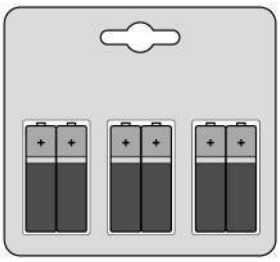
Turn over for the next question

5

18 A shop sells two brands of battery.



Brand A
Pack of 8
Price £3.60



Brand B
Pack of 6
Price £2.94

One brand A battery powers a toy for 5 hours.

One brand B battery powers the same toy for $5\frac{1}{2}$ hours.

Which brand is better value?

You **must** show your working.

[5 marks]

Work out how many hours of charge there are in total for a pack of Brand A and for a pack of Brand B. Then calculate how much the power costs per hour. The lowest cost per hour is the best value.

Answer _____

19 The value of x can be 2 or 5

The value of y can be 3 or 12

19 (a) List the possible values of xy

[2 marks]

List all the possible calculations of x x y then calculate the values of them.

Answer _____

19 (b) Work out the **least** possible value of $\frac{x-y}{x}$

You **must** show your working.

[2 marks]

Both the x in the numerator and denominator are the same. x - y needs to be as low as possible. If is is positive, we want to divide by as much as possible. If it is negative, we want to divide by as little as possible.

Answer _____

Turn over for the next question

9

20 An exam has two papers.

Anil scores

33 out of 60 on paper 1

and

75 out of 100 on paper 2

Work out his percentage score for the exam.

[3 marks]

Express the total marks scored out of the total marks on the papers as a fraction. Then convert into a percentage.

Answer _____ %

21 Purple paint is made by mixing red paint and blue paint in the ratio 5 : 2

Yan has 30 litres of red paint and 9 litres of blue paint.

What is the **maximum** amount of purple paint he can make?

[3 marks]

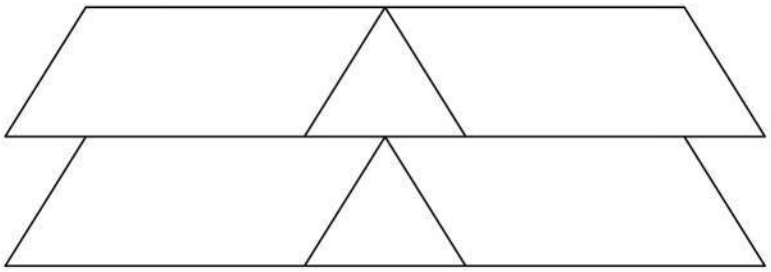
The volume of the purple paint can be found by adding the volume of the red and blue paint mixed together. Assume all the red paint is used. We can use the ratio to work out how much blue paint would be needed. If there isn't enough blue paint to use all the red paint, all of the blue paint will be used and we need to work out how much red paint would be needed.

Answer _____ litres

Turn over for the next question

6

22 This shape is made from two triangles and four congruent parallelograms.



Not drawn accurately

For each statement, tick the correct box.

22 (a) The triangles are equilateral.

All the sides are equal and the angles are all 60°.

[1 mark]

☐ Must be true

☐ Could be true

☐ Must be false

The triangles in the diagram look like they could be equilateral. But is there any way the parallelograms could be altered so that the sides and angles in the triangles aren't all the same?

22 (b) The triangles are congruent.

All of the sides and angles are the same in both triangles.

[1 mark]

☐ Must be true

☐ Could be true

☐ Must be false

The parallelograms are congruent and they share sides with the triangles. They also determine the angles within the triangles as angles around a point on a straight line are 180°.

23 (a) The length of a pipe is 6 metres to the nearest metre.

Complete the error interval for the length of the pipe.

[2 marks]

The lowest number which would round up to 6.

The lowest number which would round up to 7.

Answer _____ m ⩽ length < _____ m

23 (b) The length of a different pipe is 4 metres to the nearest metre.

Olly says,

"The total length of the two pipes is 11 metres to the nearest metre."

Give an example to show that he could be correct.

[2 marks]

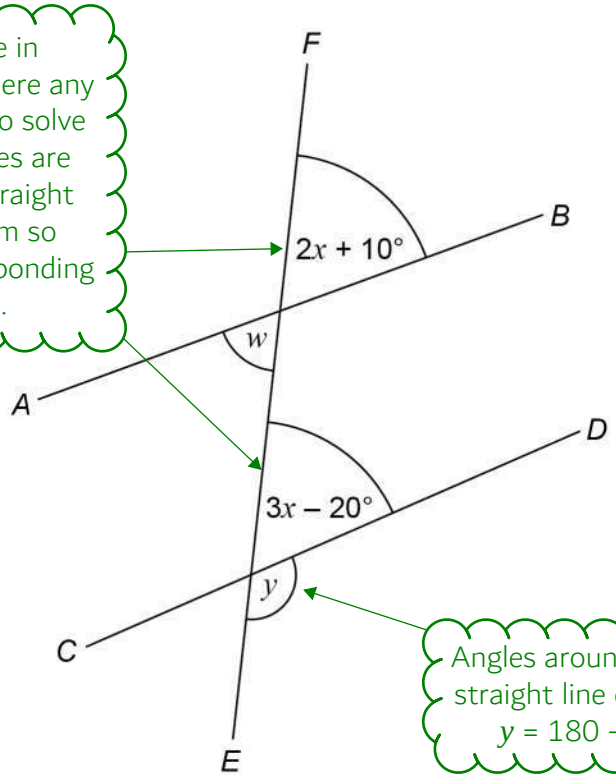
The first pipe could be more than 6 and this pipe could be more than 4. Adding them together gives a result which rounds to 11. Be careful that we select values which are actually possible.

Turn over for the next question

6

24 *AB*, *CD* and *EF* are straight lines.

The only numbers are in expressions with x. Are there any equations we can make to solve x? Consider that the lines are parallel and there is a straight line going through them so either alternate or corresponding angles can be used.



Not drawn accurately

Angles around a point on a straight line equal to 180°.
$y = 180 - (3x - 20)$

24 (a) Ava assumes that *AB* and *CD* are parallel.

What answer should she get for the size of angle y?

[4 marks]

Answer _____ degrees

24 (b) In fact,

AB and *CD* are **not** parallel

angle w is 60°

What effect does this have on the size of angle y?

Tick a box.

☐ y is bigger

☐ y is the same

☐ y is smaller

Show working to support your answer.

[3 marks]

$2x + 10$ and $3x - 20$ are no longer corresponding so x will no longer be 30. Instead we can use the fact that vertically opposite angles are equal to find x.

Turn over for the next question

7

25 There are 720 boys and 700 girls in a school.

The probability that a boy chosen at random studies French is $\frac{2}{3}$

The probability that a girl chosen at random studies French is $\frac{3}{5}$

25 (a) Work out the number of students in the school who study French.

[3 marks]

2/3 of the 720 boys and 3/5 of the 700 girls.

Answer _____

25 (b) Work out the probability that a student chosen at random from the whole school does **not** study French.

[2 marks]

The number of students who do not study French out of the total number of students in the school. This can be expressed as a fraction and represents the probability.

Answer _____

26 Circle the expression equivalent to $x^2 - 4x - 12$

[1 mark]

$(x - 4)(x - 8)$ $(x + 3)(x - 4)$ $(x - 12)(x + 1)$ $(x + 2)(x - 6)$

Expand out the brackets to see if we get the original expression.

27 How are the whole number solutions to A and B different?

A Solve $3 \leqslant 3x < 18$

B Solve $3 < 3x \leqslant 18$

[2 marks]

Simplify the inequality so that is is in terms of x instead of $3x$. Inequalities can be simplified in a similar way to equations. Then list out all of the whole numbers which satisfy the inequality for A and B to show how they are different.

END OF QUESTIONS

8