![AQA logo]

.CG Maths.
Hints

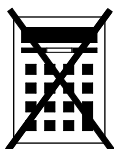# GCSE
MATHEMATICS

F

Foundation Tier   Paper 1 Non-Calculator

Tuesday 6 November 2018   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
• mathematical instruments

You must **not** use a calculator.

Instructions

• Use black ink or black ball-point pen. Draw diagrams in pencil.
• 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 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 graph paper, tracing paper and more answer 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	
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	*Do not write outside the box*

1   Work out   (–3) + (–8)

Circle your answer.

[1 mark]

−5   5   −11   11

Adding a negative is the same as subtracting

2   What does the longest bar in a bar chart represent?

Circle your answer.

[1 mark]

~~mean~~   median   mode   ~~range~~

Middle number when they are all put in order   *Most frequent result*

3   Work out   1.1 − 0.15

Circle your answer.

[1 mark]

0.95   1.05   0.85   1.085

$$1.10$$
$$-0.15$$

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IB/M/Nov18/8300/1F

4 On a circle, which of these is **always** longer than the diameter?

Circle your answer.

[1 mark]

~~chord~~   arc   ~~radius~~   circumference

These are both always shorter

5 Work out   83 × 26

[3 marks]

83
× 26

First do 6 x 83. Add a 0 on the second line and do 2 x 83. Add together the results

Answer _____

Turn over ▶

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03

6 The cost of 3 calendars is £18

Work out the cost of 5 calendars.

[2 marks]

First divide £18 by 3 to work out the cost of 1 calendar

Answer £_____

7 A helicopter blade does 3206 full turns in 7 minutes.

Work out the number of full turns per minute.

[2 marks]

7⟌3 2 0 6

Answer _____

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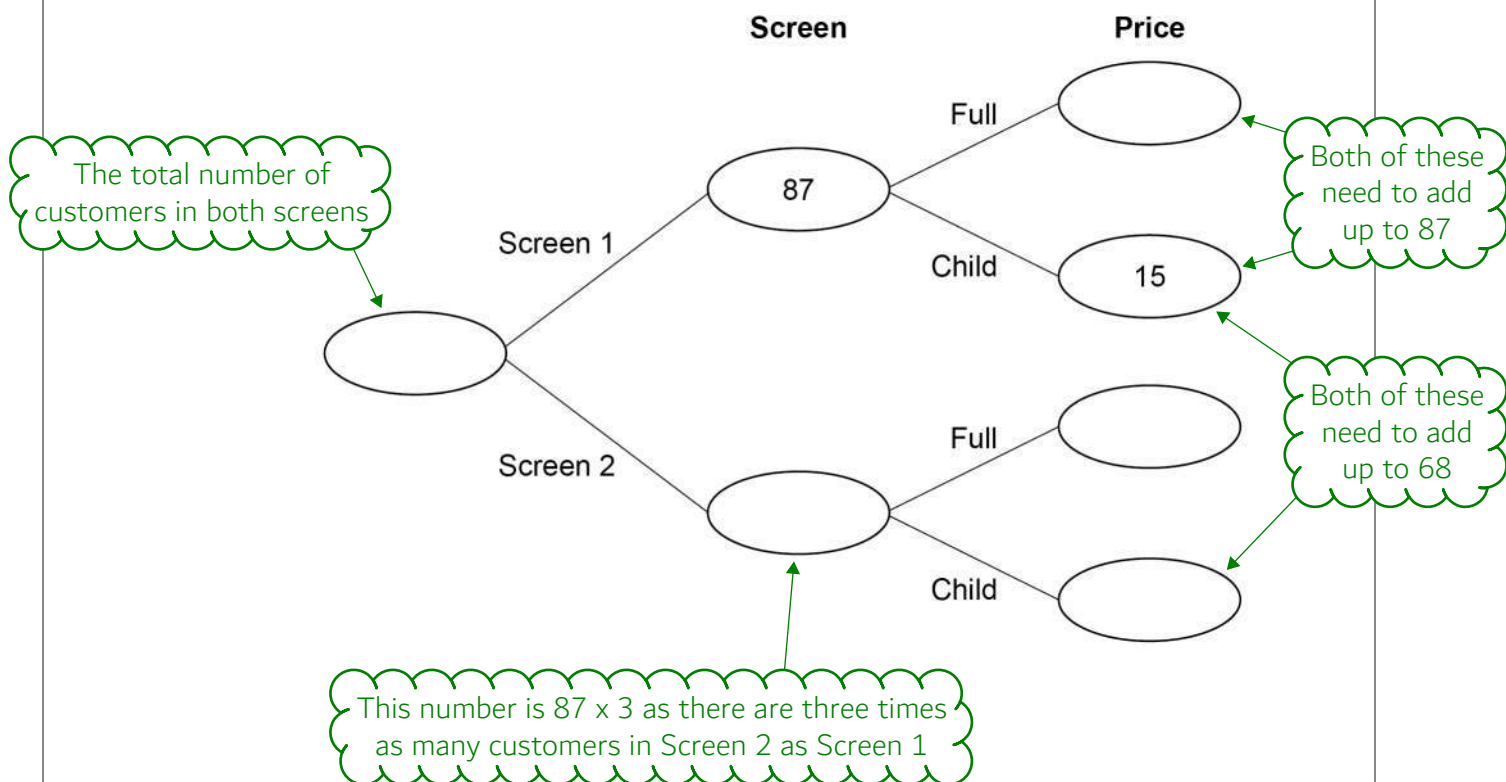**8**   At a cinema, films are shown on Screen 1 and Screen 2

Customers pay full price or child price.

There are three times as many customers in Screen 2 as Screen 1

68 customers paid child price.

Complete the frequency tree.

[5 marks]

Screen   Price

Full

87

Full

The total number of customers in both screens

Screen 1

Both of these need to add up to 87

Child   15

Child

Screen 2

Full

Both of these need to add up to 68

Child

This number is 87 x 3 as there are three times as many customers in Screen 2 as Screen 1

9

Turn over ▶

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IB/M/Nov18/8300/1F

9   Work out the fraction that is halfway between $\frac{1}{2}$ and $1\frac{1}{4}$

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├───┬───┬───┬───┬───┬───┬───┬───┬───┤
0               1               2
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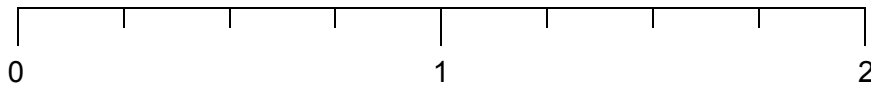
[3 marks]

Mark both fractions on the scale then mark the point halfway between them. The scale goes up 1/4 each division

Answer _____

10 x is a positive integer.

35 ÷ x is a positive integer.

Positive integer: whole number greater than 0

Work out the **four** possible values of x.

[2 marks]

It is basically asking for four factors of 35: whole numbers 35 can be divided by to get another whole number

Answer _____ _____ _____ _____

11 A fair dice has six sides, numbered 1 to 6

After it is rolled, five of the numbers can be seen.

11 (a) Write down the probability that one of these five numbers is 2

[1 mark]

Answer _____

There are 5 possibilities where the 2 can be seen out of 6 possibilities

11 (b) Work out the **greatest** possible sum of the five numbers.

[2 marks]

The greatest possible sum is when the 1 can't be seen

Answer _____

Turn over for the next question

8

Turn over ▶

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07

12   Work out $\dfrac{2}{7} + \dfrac{6}{7}$

Circle your answer.

[1 mark]

$1\dfrac{1}{7}$ ~~$\dfrac{8}{14}$~~   ~~$\dfrac{8}{49}$~~ $1\dfrac{5}{7}$

As the denominators are the same the numerators can be added. 2 + 6 = 8. The denominator stays the same so as an improper fraction it is 8/7. Therefore it can't be these two

13   Work out   4 + 3 × 5 – 1

Circle your answer.

[1 mark]

16   18   28   34

The order of operations (BIDMAS) needs to be followed

14   The nth term of a sequence is $5n - 2$

Work out the 3rd term.
Circle your answer.

[1 mark]
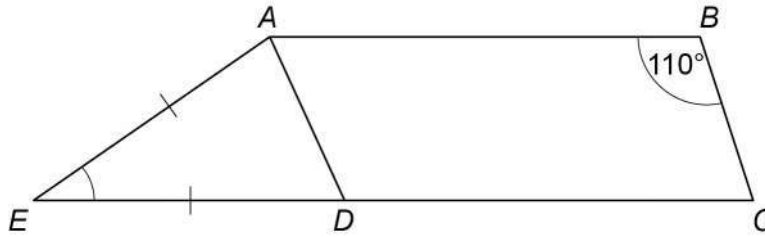
51   5   123   13

n = 3 as it is the 3rd term. Substitute this into the expression

15 Trapezium *ABCE* is made from parallelogram *ABCD* and isosceles triangle *ADE*.

AE = DE

Not drawn accurately

Work out the size of angle *AED*.

[3 marks]

Opposite angles in a parallelogram are equal. Angles on a straight line add to 180 degrees. Base angles of an isosceles triangle are equal. There are 180 degrees in a triangle

Answer _____ degrees

16 $a : b = 1 : 6$

$a : c = 3 : 1$

How many times bigger is b than c?

[2 marks]

Combine the ratios together by making the same number of parts for a. Multiply both sides of the ratio by the same amount when converting. Once there is a combined ratio, work out how many times more parts there are for b than c

Answer _____

8

Turn over ▶

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17 (a) Laura wants to work out   3% of 1700

Her method is   1700 × 0.3

Is her method correct?

Tick a box.

☐ Yes   ☐ No

Give a reason for your answer.

[1 mark]

Convert 0.3 into a percentage

_____

_____

_____

17 (b) Laura also wants to work out $\dfrac{30}{29}$ of 60

Her answer is 58

Is her answer correct?

Tick a box.

☐ Yes   ☐ No

Give a reason for your answer.

[1 mark]

Do not work out 30/29 of 60. Consider that 30/29 is greater than 1

_____

_____

18   Here are five shapes, A to E.

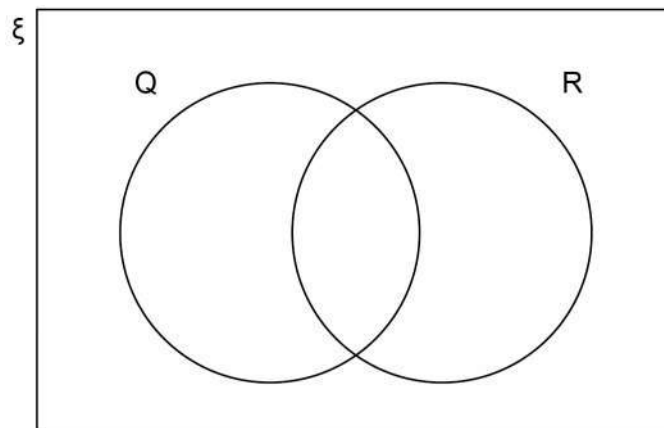| A	Parallelogram
B	Regular pentagon
C	Rhombus
D	Scalene triangle
E	Trapezium

In the Venn diagram,

ξ is the set of all shapes

Q is the set of quadrilaterals ← *4-sided shapes*

R is the set of shapes which **always** have rotational symmetry. *Can be rotated within 360 degrees and looks the same*

Complete the Venn diagram with the letters A to E.

[3 marks]

5

Turn over ▶

19 $a = 7$ and $b = 2$

Work out the value of $\dfrac{a}{b} - a^b$

[3 marks]

$\dfrac{7}{2} - 7^2$ ← Substituting in 7 for a and 2 for b

Work out 7/2 as a decimal and subtract 7^2

Answer _____

20   Solve $3x - 8 = 19$

[2 marks]

Follow the order of operations (BIDMAS) backward to decide what needs to be got rid of on the left side first (to get x on its own). Do the opposite of what the number is doing to get rid of it e.g. the opposite of - 8 is + 8

$x =$ _____

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21   Here are five number cards.

$$\boxed{17} \quad \boxed{12} \quad \boxed{23} \quad \boxed{15} \quad \boxed{16}$$

Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than** 30

[3 marks]

$30 - 17 = 13 \qquad 3$

If 17 is the first card picked, any card picked for the second card which is more than 13 will give a total more than 30. There are 3 other cards more than 13

Use a similar method to work out how many ways there are of getting totals more than 30 for when the other cards are picked as the first card

$5 \times 4 = 20$

There are 5 options for the first card and for each of these there are another 4 options for the second card. So there are 20 ways of picking two cards

Express the number of ways of getting more than 30 as a fraction of the number of ways of picking two cards. This fraction is the probability

Answer _____

8

Turn over ▶

.**CG Maths.**

22 (a) Complete the table of values for $y = x^2$

[1 mark]

x	–2	–1	0	1	2
y	$(-2)^2$				

Negative multiplied by negative is positive

22 (b) Draw the graph of $y = x^2$ for values of x from –2 to 2

[2 marks]
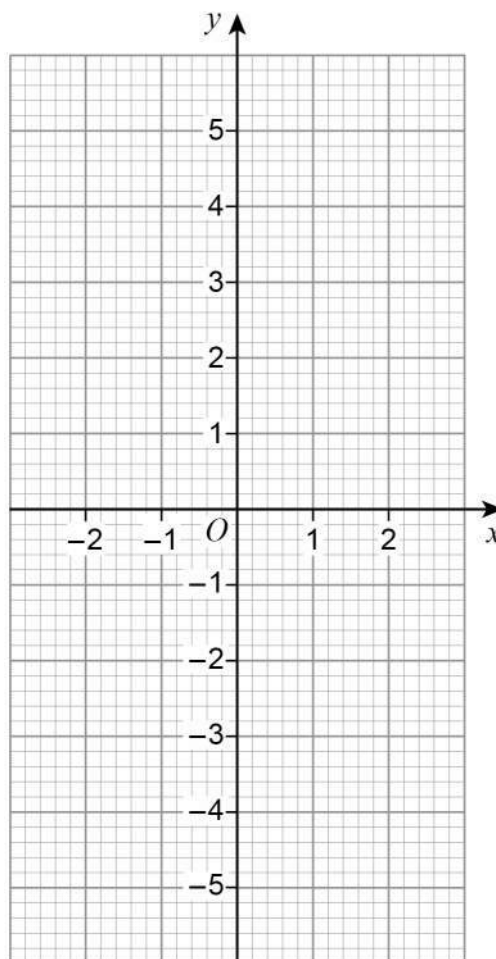
Plot the points from the table of values then join up with a smooth curve

22 (c) Use your graph to estimate the value of $\sqrt{2.6}$

[2 marks]

x is squared to get y, so y is square rooted to get x. Read across from 2.6 on the y-axis to the curve then down to the x-axis

Answer _____

.**CG Maths.**

1 4

23   Two consecutive whole numbers are n and $n + 1$

23 (a)   Simplify $n - (n + 1)$

[1 mark]

Everything in the bracket is multiplied by -1 so it becomes n - n - 1

Answer _____

23 (b)   Multiply out $n(n + 1)$

[1 mark]

Answer _____

23 (c)   The two numbers are added.

Show that the answer must be an odd number.

[2 marks]

$n + n + 1 = 2n + 1$

n is a whole number so if it is multiplied by 2 it must be even as it will be divisible by 2. Then 1 is added

9

Turn over ▶

24   Circle the value of cos 30°

[1 mark]

$$\frac{1}{2} \qquad \frac{\sqrt{3}}{2} \qquad 0 \qquad 1$$

The angles we need to remember are 0, 30, 45, 60 and 90. List these out then write 4, 3, 2, 1 and 0 under them. Square root them and put them over 2

25   Work out $8\frac{1}{2} \div 2\frac{2}{3}$

Give your answer as a mixed number.

[4 marks]

1. Convert into improper fractions by multiplying the whole number by the denominator then adding the result to the numerator.

2. Divide by a fraction by using 'keep, change, flip'.

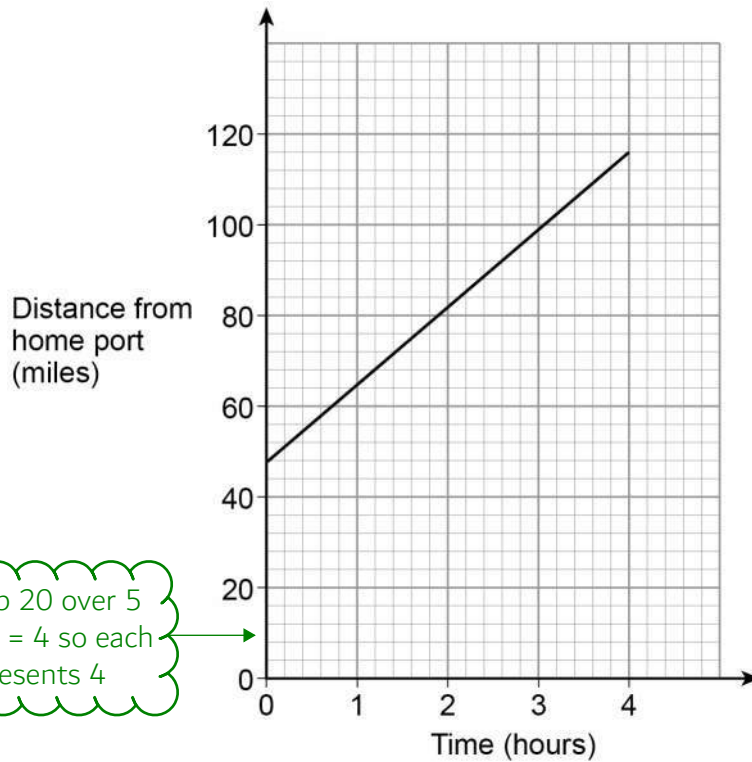*3. Multiply the fractions by multiplying the numerators and denominators together.*

4. Divide the numerator by the denominator to work out the whole number and leave the remainder in the fraction

Answer _____

26 A ship is sailing in a straight line from its home port.

The distance-time graph shows 4 hours of the journey.

The scale goes up 20 over 5 small boxes. 20/5 = 4 so each small box represents 4

Distance from home port (miles)

Time (hours)

Work out the speed of the ship during these 4 hours.

[3 marks]

Miles per hour so we need to divide the miles by the hours

Answer _____ mph

8

Turn over ▶

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1 7

27 Kim works at an airport in the UK.

She records the number of planes landing between 10 am and 2 pm each day.

The table shows the data for the first 10 days in January.

Day	1	2	3	4	5	6	7	8	9	10
Number of planes	148	151	147	155	153	147	155	102	151	154

27 (a) The airport was affected by fog on one of the days.

Which day do you think it was?

Give a reason for your answer.

[1 mark]

Day _____

Reason _____ All of the days are around 150 apart from one _____

_____

27 (b) Kim uses the data to predict how many planes will land at the airport in a year.

In her method, she

uses an estimate of 150 planes in each 4-hour period throughout the day

assumes the same number of planes each day.

Work out her prediction.

[3 marks]

_____ There are 24 hours in a day and 365 days in a year. First work out how many planes there would be in a day by multiplying 150 by the number of 4-hour periods in a day. Then multiply this by the number of days in a year _____

_____

_____

Answer _____

Do not write outside the box

27 (c) In fact,

fewer planes land in winter than in summer

fewer planes land at night than during the day.

What does this tell you about Kim's prediction?

Tick **one** box.

☐ Her prediction is too low

☐ Her prediction is too high

☐ Her prediction could be too low or too high

Give a reason for your answer.

[2 marks]

The prediction was based on the data collected from 10am to 2pm in January. This is in the day and in the Winter

Turn over for the next question

6

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28 The sum of the angles in any quadrilateral is 360°

For example, in a rectangle 4 × 90° = 360°

Zak writes,

   5 × 90° = 450° so the sum of the angles in any pentagon must be 450°

Is he correct?

Tick a box.

☐ Yes   ☐ No

Show working to support your answer.

[2 marks]

Sum of interior angles = (n - 2) x 180, where
n is the number of sides of the polygon

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29 $\sqrt{6^2 + 8^2} = \sqrt[3]{125a^3}$

Work out the value of a.

[4 marks]

On the left side, work out 6^2 and 8^2, add them together then square root. On the right side, cube root 125 and cube root a^3 and leave them multiplied together. This will make an equation which is much easier to solve with some simple rearranging

Answer _____

30 Work out the percentage increase from 80 to 280

[3 marks]

Express the increase as a fraction of the original, simplify the fraction (by dividing the numerator and denominator by the same amount) until the denominator can be multiplied to get 100. Percentage is out of 100 so is the numerator when the fraction is expressed out of 100

Answer _____ %

Turn over for the next question

9

Turn over ▶

31   Solve $x^2 - x - 12 = 0$

[3 marks]

$(x \quad)(x \quad) = 0$

Factorise the left side. Look for two numbers which multiply to -12 and add to -1 and put these in the brackets with x. Then use the fact that one of the brackets must be equal to 0 in order to multiply to 0 to write two different equations which can be rearranged to find x

Answer _____

END OF QUESTIONS

3

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2   2