Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

F

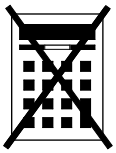
Foundation Tier Paper 1 Non-Calculator

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	

N 0 V 1 8 8 3 0 0 1 F 0 1

IB/M/Nov18/E5

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

.CG Maths.

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. -3 - 8 = -11

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

Circle your answer.

[1 mark]

mean median mode range

Mode is the most frequent result

3 Work out 1.1 – 0.15

Circle your answer.

[1 mark]

0.95 1.05 0.85 1.085

$$\begin{array}{r} {}^{0}\not{1}.{}^{10}\not{1}0 \\ -\,0.15 \\ \hline 0.95 \end{array}$$

Do not write outside the box

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

Circle your answer.

[1 mark]

chord arc radius circumference

Circumference = π x diameter
So the circumference must be longer than the diameter

5 Work out 83 × 26

[3 marks]

$$\begin{array}{r} 83 \\ \times 26 \\ \hline 498 \\ 1660 \\ \hline 2158 \\ {\scriptstyle 1\,1} \end{array}$$

Answer 2158

7

Do not write outside the box

6 The cost of 3 calendars is £18

Work out the cost of 5 calendars.

[2 marks]

$\frac{18}{3} \times 5$

Dividing £18 by 3 works out the cost of 1 calendar. 18/3 = 6.
Multiplying this by 5 works out the cost of 5 calendars. 5 x 6 = 30

Answer £ 30

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

Work out the number of full turns per minute.

[2 marks]

Answer 458

$7\overline{)3\,2^{4}0^{5}6}$

Do not write outside the box

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

Customers pay full price or child price.

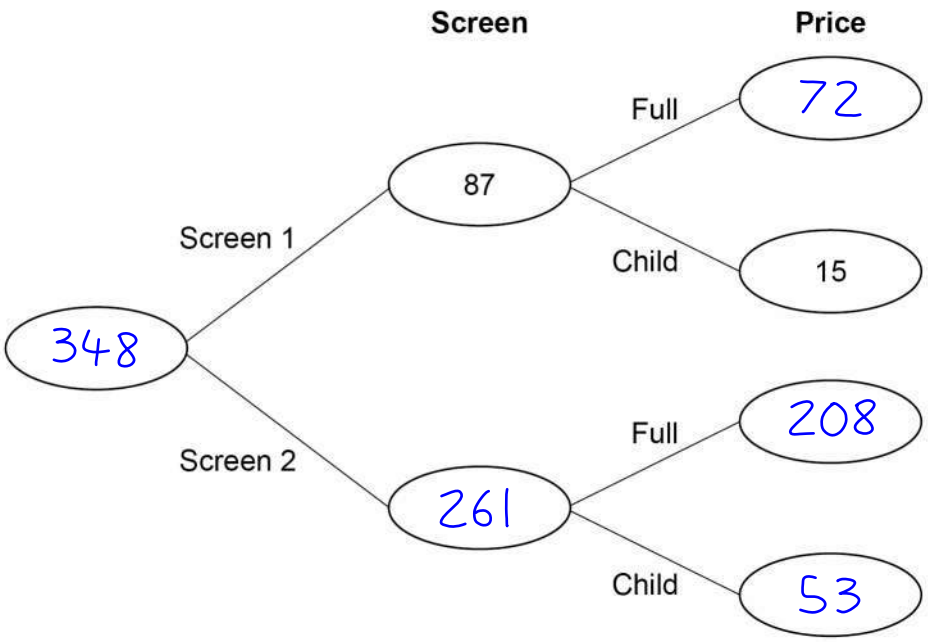
There are three times as many customers in Screen 2 as Screen 1

68 customers paid child price.

Complete the frequency tree.

[5 marks]

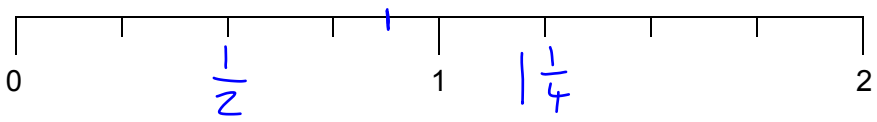
87 × 3 = 261 261 + 87 = 348 68 − 15 = 53 261 − 53 = 208 87 − 15 = 72



9

Do not write outside the box

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



[3 marks]

The scale goes up 1/4 each division. The halfway point is halfway through one of the divisions. Half of 1/4 is 1/8. 1/8 less than 1 is 7/8

Answer $\frac{7}{8}$

10 x is a positive integer.

$35 \div x$ is a positive integer.

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

[2 marks]

$35 \div 1 = 35$
$35 \div 35 = 1$
$35 \div 5 = 7$
$35 \div 7 = 5$

Answer 1 35 5 7

Do not write outside the box

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 $\frac{5}{6}$

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]

$2+3+4+5+6$

The greatest possible sum is when the 1 can't be seen. This leaves 2, 3, 4, 5 and 6 being seen

Answer 20

Turn over for the next question

8

Do not write outside the box

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

Circle your answer.

[1 mark]

$1\frac{1}{7}$ $\frac{8}{14}$ $\frac{8}{49}$ $1\frac{5}{7}$

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. This converts into this one as a mixed fraction

13 Work out $4 + 3 \times 5 - 1$

Circle your answer.

[1 mark]

16 18 28 34

The order of operations (BIDMAS) needs to be followed so multiplication comes first. 3 x 5 = 15. 4 + 15 = 19. 19 - 1 = 18

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

Work out the 3rd term.

Circle your answer.

[1 mark]

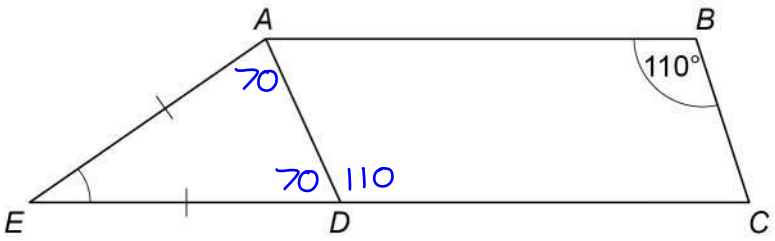
51 5 123 13

n = 3 as it is the 3rd term. 5 x 3 - 2 = 15 - 2 = 13

Do not write outside the box

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]

ADC = 110 as opposite angles in a parallelogram are equal.
ADE = 70 as angles on a straight line add to 180 degrees and 180 - 110 = 70.
DAE = 70 as base angles of an isosceles triangle are equal.
AED = 40 as there are 180 degrees in a triangle and 180 - 70 - 70 = 40

Answer 40 degrees

16 $a : b = 1 : 6$

$a : c = 3 : 1$

How many times bigger is b than c?

[2 marks]

a	b	c
1	6	
3		1
3	18	1

Combining the ratios together. Multiplying both sides of the ratio 1 : 6 by 3 makes it so that the two ratios are compatible as they have the same number of parts for a. 1 x 3 = 3. 6 x 3 = 18. The 18 parts for b are 18 times greater than the 1 part for c

Answer 18

8

Do not write outside the box

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]

It finds 30%

0.3 as a percentage is 30% as 0.3 x 100 = 30

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

Her answer is 58

Is her answer correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

[1 mark]

$\frac{30}{29} > 1$

As 30/29 is greater than 1, the answer will be more than 60

Do not write outside the box

18 Here are five shapes, A to E.

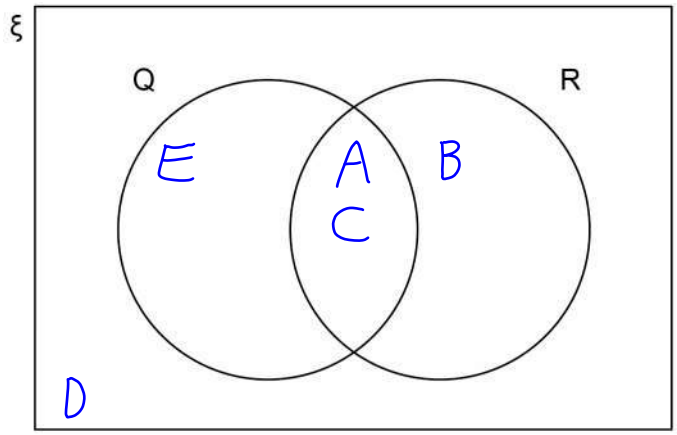
A	Parallelogram
B	Regular pentagon
C	Rhombus
D	Scalene triangle
E	Trapezium

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 ►

Do not write outside the box

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

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

[3 marks]

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

$3.5 - 49$ ← 7/2 = 3.5 and 7^2 = 7 x 7 = 49

$$\begin{array}{r} 4^{8}\cancel{9}.^{1}0 \\ -\ 3.5 \\ \hline 45.5 \end{array}$$ ← Considering it as -49 + 3.5. The 3.5 is taken away from how negative the 49 is

Answer -45.5

20 Solve $3x - 8 = 19$

[2 marks]

$3x = 27$ ← Adding 8 to both sides to get rid of the -8 from the left side

Dividing both sides by 3 to get rid of the 3 on the left side

$x =$ 9

Do not write outside the box

21 Here are five number cards.

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
30 − 12 = 18
30 − 23 = 7
30 − 15 = 15
30 − 16 = 14

3
1
5
2
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

A similar method is used 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

3 + 1 + 5 + 2 + 3 = 14 so there are 14 ways of picking two cards at random and getting a total more than 30

5 × 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

14 out of the 20 possibilities get a total more than 30

Answer $\frac{14}{20}$

8

Turn over ►

Do not write outside the box

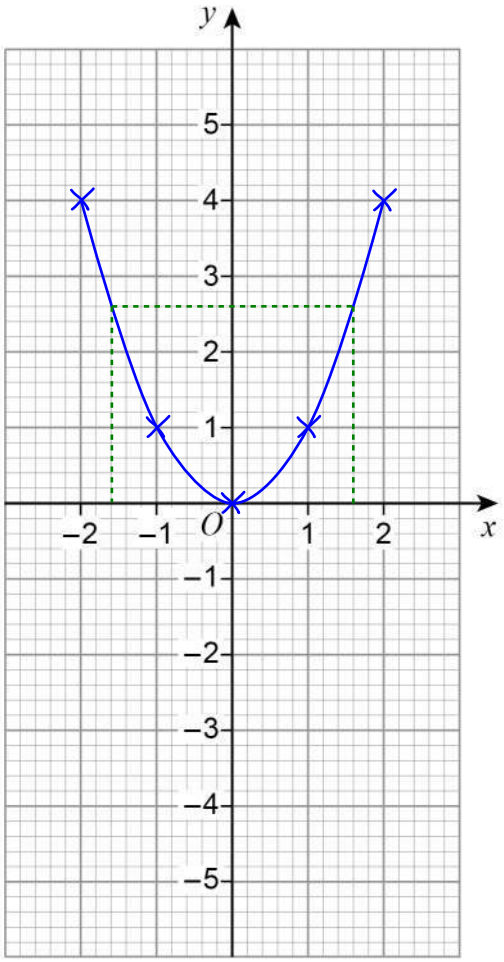
22 (a) Complete the table of values for $y = x^2$

[1 mark]

x	–2	–1	0	1	2
y	4	1	0	1	4

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

[2 marks]



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. Reading across from 2.6 on the y-axis to the curve then down to the x-axis

Answer 1.6 , -1.6

Do not write outside the box

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 -1

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

[1 mark]

Answer n^2+n

23 (c) The two numbers are added.

Show that the answer must be an odd number.

[2 marks]

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

2n is even. Even + 1 is odd ← n is a whole number so if it is multiplied by 2 it must be even as it will be divisible by 2

9

Do not write outside the box

24 Circle the value of cos 30°

[1 mark]

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

0 30 45 60 90
4 3

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

Give your answer as a mixed number.

[4 marks]

$\frac{17}{2} \div \frac{8}{3}$ ← Converted into improper fractions by multiplying the whole number by the denominator then adding the result to the numerator

$\frac{17}{2} \times \frac{3}{8}$ ← Divide by a fraction by using 'keep, change, flip'

17
× 3
51

$\frac{51}{16}$ ← Multiply the fractions by multiplying the numerators and denominators together

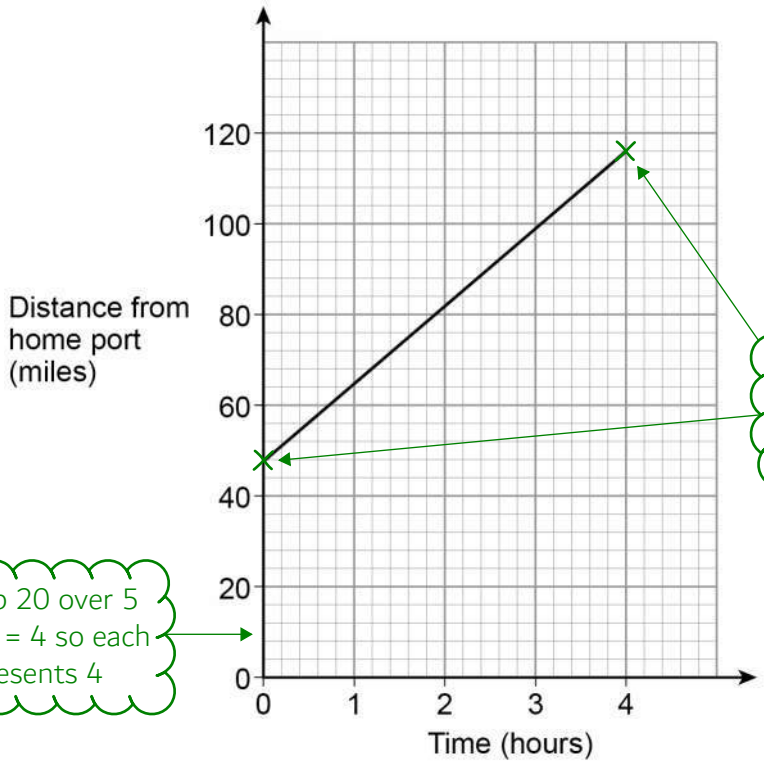
16, 32, 48, 64 ← Listing out the multiples of 16 to work out how many lots of 16 go into 51. 3 lots fit in with a remainder of 3

Answer $3\frac{3}{16}$

Do not write outside the box

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

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



The ship started at a distance of 48 miles and finished at 116 miles

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

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

[3 marks]

116
− 48
68

This works out the number of miles travelled during the 4 hours

Answer 17 mph

4 | 68

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

8

1 7

Do not write outside the box

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 8

Reason It is an outlier

All of the other days are around 150. Day 8 isn't close to this

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]

150

x 6

900

There are 24 hours in a day. 24/4 = 6 so there are 6 4-hour periods each day. This works out that there are 900 planes each day

365

x 900

There are 365 days in a year

Answer 328500

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]

Fewer in winter means it could be too low. Fewer at night means it could be too high.

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

Do not write outside the box

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]

$(5-2)\times 180$

180

$\times \quad 3$

540

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

Do not write outside the box

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

Work out the value of a.

[4 marks]

36

+64

100

$6^2 = 36$ and $8^2 = 64$

$10 = 5a$

The square root of 100 is 10. The cube root of 125 is 5 and the cube root of a^3 is a

Dividing both sides by 5 gets 2 = a

Answer 2

30 Work out the percentage increase from 80 to 280

[3 marks]

$280 - 80 = 200$

Working out the increase

$\frac{200}{80} = \frac{20}{8} = \frac{10}{4} = \frac{250}{100}$

Expressing the increase as a fraction of the original then simplifying the fraction (by dividing the numerator and denominator by the same amount) until the denominator is 4, which can be multiplied by 25 to get 100

Answer 250 %

Turn over for the next question

9

Do not write outside the box

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

[3 marks]

$1 \times 12, 2 \times 6, 3 \times 4$ ← Looking for two numbers which multiply to -12 and add to -1. Listing out the factor pairs of 12 until they add to -1 (when one of the pair is negative in order to multiply to a negative)

$(x+3)(x-4)=0$ ← Factorising the left side

Either x + 3 = 0 or x - 4 = 0 (as the only way of multiplying two brackets together and getting 0 is if one of them is equal to 0). Rearranging gives these solutions

Answer $x = -3, x = 4$

END OF QUESTIONS

3