Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

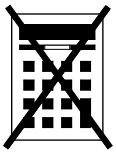
Foundation Tier Paper 1 Non-Calculator

Tuesday 21 May 2019 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 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	
26	
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

.CG Maths.

Answer **all** questions in the spaces provided

Do not write outside the box

1 Which type of angle is the largest?

Circle your answer.

[1 mark]

right — 90 degrees

reflex — More than 180 degrees

obtuse — More than 90 but less than 180 degrees

acute — Less than 90 degrees

2 Solve $4x = 8$

Circle your answer.

[1 mark]

$x = 0.5$ $\quad$ $x = 2$ $\quad$ $x = 4$ $\quad$ $x = 32$

Dividing both sides by 4 to get x on its own. $8/4 = 2$

3 Work out $10 + (-4)$

Circle your answer.

[1 mark]

–14 $\quad$ –6 $\quad$ 6 $\quad$ 14

Adding a negative is the same as subtracting. $10 - 4 = 6$

Do not write outside the box

4 Circle the calculation which works out half of 12

[1 mark]

12 ÷ 0.5 2 ÷ 12 $12 \times \frac{1}{2}$ 12 ÷ 50 × 100

'Of' means multiply. 1/2 x 12 is the same as 12 x 1/2

5 (a) Work out 364.5 + 17.9 – 2.08

[2 marks]

364.5
+ 17.9
382.4
382.40
− 2.08
380.32

364.5 + 17.9 = 382.4

Add a 0 so that 382.4 has the same number of decimal places as 2.08.
382.40 - 2.08 = 380.32

Answer 380.32

5 (b) Work out 9.36 × 2

[1 mark]

9.36
× 2
18.72

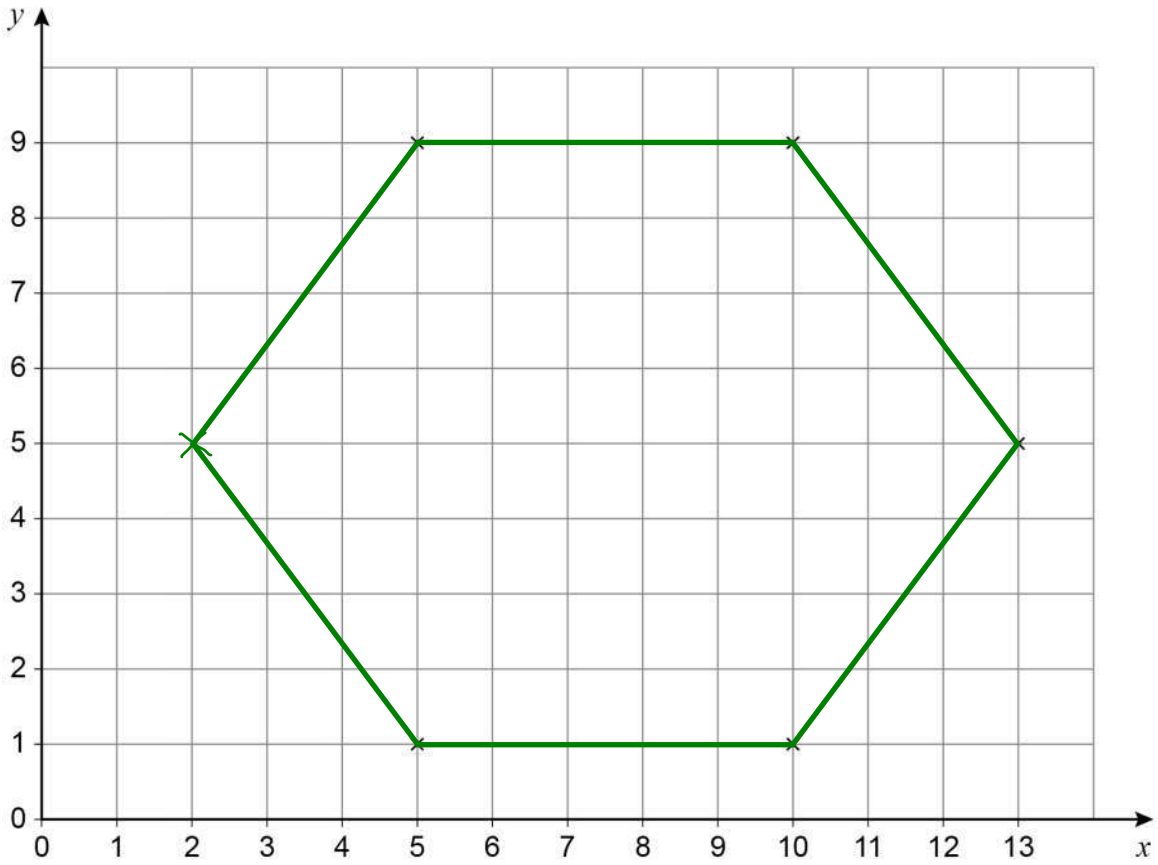
As there is only one decimal in the multiplication, it is fine to use column multiplication as long as the decimal point is kept in the same place in the answer

Answer 18.72

7

Do not write outside the box

6 Five points are plotted on a centimetre grid.



The points are five of the vertices of a hexagon.

Each side of the hexagon has the same length.

Work out **one** possible pair of coordinates of the other vertex.

[2 marks]

Answer (2 , 5)

Do not write outside the box

7 Amy and Brad each have some money.

Carly has no money.

Amy gives £7 to Carly.

Brad gives £5 to Carly.

Now they all have the same amount of money.

How much money did Amy have to begin with?

[2 marks]

7 + 5 + 7

Carly started with £0 so the £7 from Amy add the £5 from Brad works out how much money she now has. As they now all have the same amount of money, Amy also has £7 + £5 but started with £7 more so another £7 has to be added to get what she started with

Answer £ 19

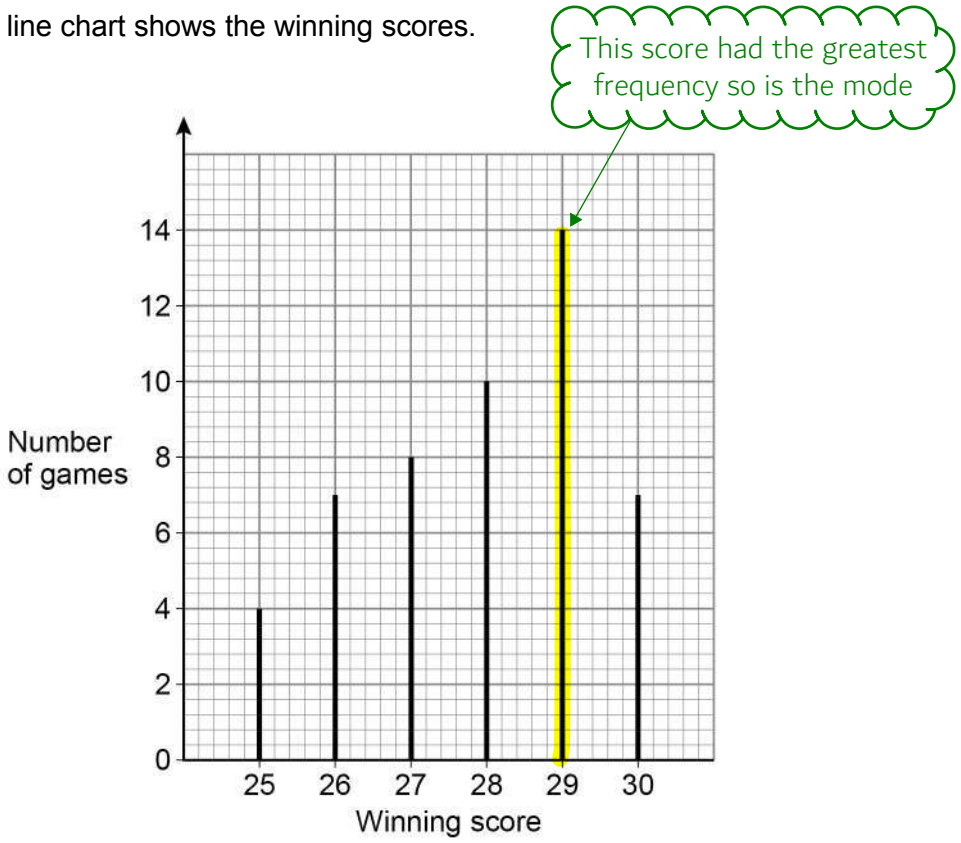
Turn over for the next question

4

Do not write outside the box

8 A game is played 50 times.

The vertical line chart shows the winning scores.



8 (a) Write down the mode.

[1 mark]

Answer 29

Do not write outside the box

The game is played again.

8 (b) Use the chart to estimate the probability that the winning score is 25

[1 mark]

Answer $\frac{4}{50}$

4 out the the 50 games had a winning score of 25

8 (c) Use the chart to estimate the probability that the winning score is 27 or more.

[2 marks]

$8+10+14+7$

8 scores were 27.
10 scores were 28.
14 scores were 29.
7 scores were 30.
Adding these altogether gives 39, which is the total number of games which had 27 or more

Answer $\frac{39}{50}$

This is 39 out of the 50 games

9 (a) Write down **all** the factors of 18

[2 marks]

Answer 1, 18, 2, 9, 3, 6

Listing the factors in pairs starting with the smallest. 1 x 18, 2 x 9, 3 x 6. Because there are no factors between 3 and 6, they are all listed

9 (b) Work out the lowest common multiple (LCM) of 12 and 15

[2 marks]

15, 30, 45,

Listing out the multiples of 15 until one is also a multiple of 12

Answer 60

8

Do not write outside the box

10 Coaches take people to a festival.

Each coach can take 50 people.

10 (a) From one city there are 820 people.

How many coaches are needed?

[3 marks]

16
50 | 8 2 ³²0

16 lots of 50 go into 820 with a remainder so another coach will be needed for the remaining people

Answer 17

Do not write outside the box

10 (b) From a different city 13 coaches are needed.

Each coach costs £450 to hire.

Work out the total cost of hiring 13 coaches.

[3 marks]

450
× 13
1350
4500

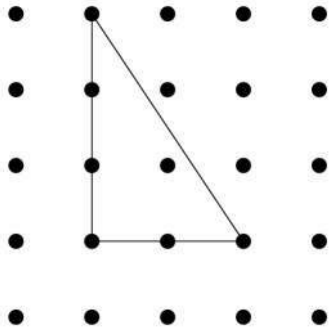
Answer £ 5850

Turn over for the next question

6

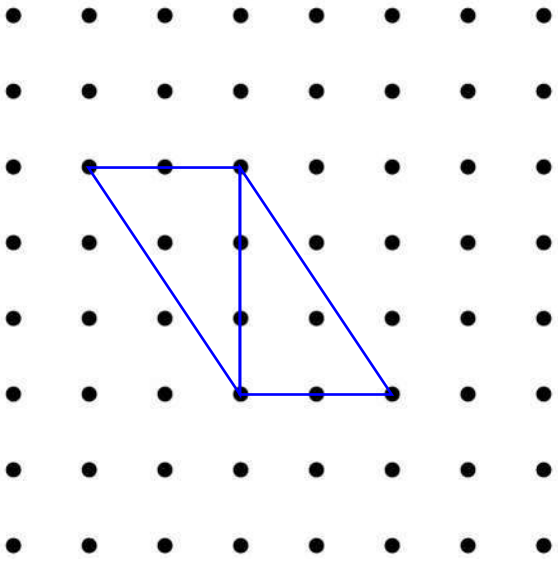
Do not write outside the box

11 Here is a triangle on a square dotty grid.



11 (a) On the grid below, show how you can make a parallelogram with **two** of these triangles.

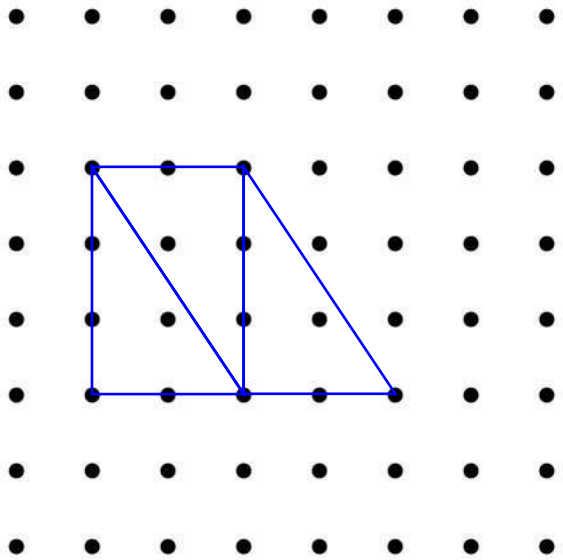
[1 mark]



Do not write outside the box

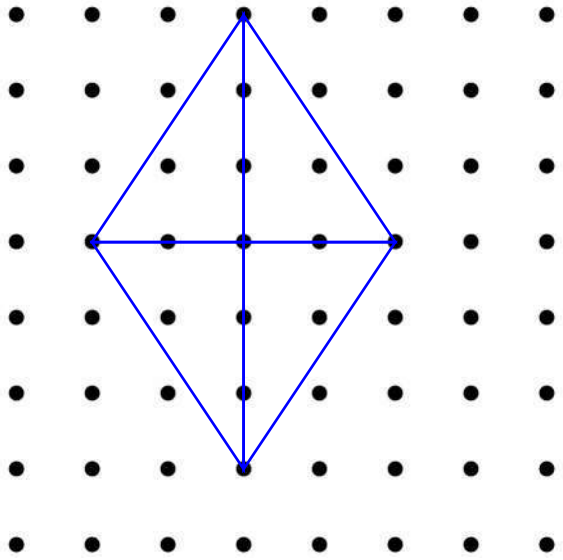
11 (b) On the grid below, show how you can make a trapezium with **three** of these triangles.

[1 mark]



11 (c) On the grid below, show how you can make a rhombus with **four** of these triangles.

[1 mark]



3

Do not write outside the box

12 Work out 65% of 300

[3 marks]

To find 1%, divide by 100.
300/100 = 3. Then
multiply by 65 to get 65%

65
× 3

Answer 195

13 In a game the average score was 50

Tom's score was $\frac{5}{2}$ of the average.

Circle Tom's score.

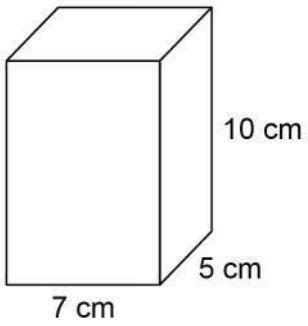
[1 mark]

(125) 175 30 20

To find a fraction of an amount, divide the amount by the denominator of the fraction then multiply by the numerator.
50/2 = 25
25 x 5 = 125

Do not write outside the box

14 Here is a cuboid.



Work out the volume.

[2 marks]

7 × 5 × 10 ← Volume of cuboid = length x width x height

Answer 350 cm^3

15 Circle the shape that has a uniform cross section.

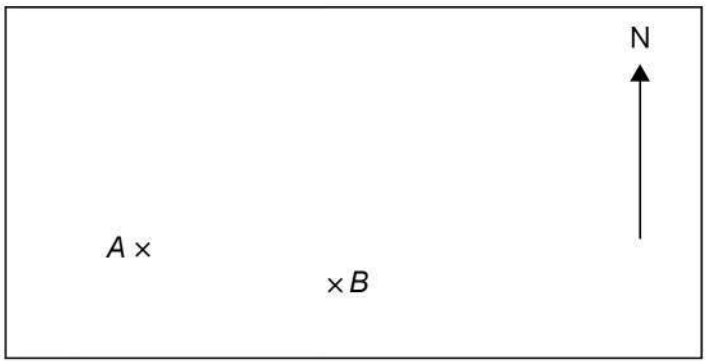
[1 mark]

cone sphere (cylinder) pyramid

7

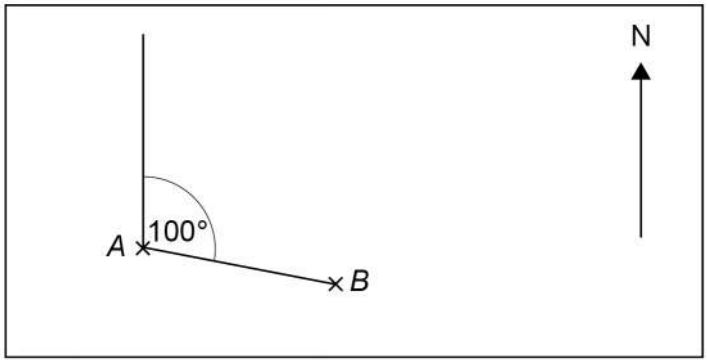
Do not write outside the box

16 (a) Here is a map showing points *A* and *B*.



Kemal wants to measure the bearing of ***A* from *B***.

He draws two lines and measures the angle between them.



Kemal says that the bearing of *A* from *B* is 100°

Is his method correct?

Give a reason for your answer.

[1 mark]

No, he has measured B from A

Do not write outside the box

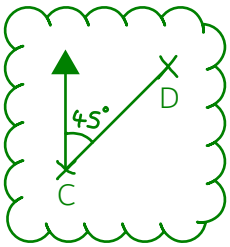
16 (b) On a different map, the bearing of *D* from *C* is 045°

Nina says,

"*D* is North West of *C*."

Is Nina correct?

Give a reason for your answer.

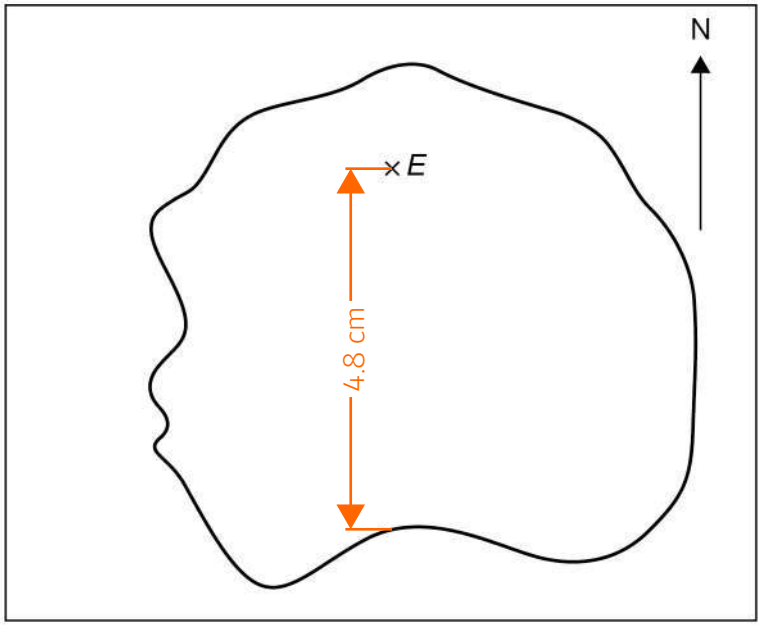


[1 mark]

No, D is North East of C

16 (c) This map shows an airport, *E*, on an island.

Scale: 1 cm represents 100 km



A plane flies due South from the airport.

How far does it fly until it reaches the sea?

[3 marks]

4.8 × 100

Answer 480 km

5

Do not write outside the box

17 (a) Simplify fully 56 : 24

[2 marks]

To simplify a ratio, divide both sides by the same amount. 56/8 = 7 and 24/8 = 3. Both 7 and 3 can't be divided by the same amount any further

Answer 7 : 3

17 (b) Write the ratio 5 : 4 in the form n : 1

[1 mark]

4 has been divided by 4 to get 1 so the 5 needs to be divided by 4 as well. There is no need to convert it into a decimal

Answer $\frac{5}{4}$: 1

17 (c) Share £180 in the ratio 1 : 9

[2 marks]

There is £180 in total and 10 parts in total in the ratio. Dividing 180 by 10 works out what 1 part is worth. 180/10 = 18. Multiplying this by 9 works out what 9 parts are worth

18
× 9

Answer £ 18 and £ 162

Do not write outside the box

18 Here is some data about the people listening to a radio station one day.

	Percentage	Mean number of hours listening	Range of number of hours listening
Aged 40 or under	21	1.2	4.5
Aged 41 or over	79	6.3	13.9

Compare the data for people aged 40 or under with the data for people aged 41 or over.
Make **three** comparisons.

[3 marks]

Comparison 1 Aged 41 or over had a higher percentage

Comparison 2 Aged 41 or over had a higher mean

Comparison 3 Aged 41 or over had a higher range

Turn over for the next question

8

Do not write outside the box

19 You are given that $4a - 2b = 10$

19 (a) Write down the value of $2a - b$

[1 mark]

Answer 5

2a - b is half of 4a - 2b

19 (b) Write down the value of $2b - 4a$

[1 mark]

Answer -10

The 4a has become negative and the -2b has become positive. So the sign for the answer will flip to a negative

19 (c) You are given that $4a - 2b = 10$ **and** $a + c = 3$

Write an expression in a, b and c that is equal to 23
Give your answer in its simplest form.
You **must** show your working.

[2 marks]

$4a - 2b + 4a - 2b + a + c$ ← 10 + 10 + 3 = 23

10 10 3

Collected like terms and simplified.
4a + 4a + a = 9a
-2b - 2b = -4b

Answer $9a - 4b + c$

Do not write outside the box

20 (a) Write 0.00097 in standard form.

[1 mark]

Answer 9.7×10^{-4}

Multiplied by 10 4 times to get 9.7, a number between 1 and 10. So it must be multiplied by 10^{-4} (which basically means divide by 10 4 times) to make up for this

20 (b) Work out $\frac{3 \times 10^5}{4 \times 10^3}$

Give your answer as an ordinary number.

[2 marks]

0.75×10^2 ← 3/4 = 0.75
Using $a^x/a^y = a^{x-y}$
$10^5/10^3 = 10^{5-3} = 10^2$

0.75 multiplied by 10 twice gives 75

Answer 75

Turn over for the next question

7

Do not write outside the box

21 Anna plays a game with an ordinary, fair dice.

If she rolls 1 she wins.

If she rolls 2 or 3 she loses.

If she rolls 4, 5 or 6 she rolls again.

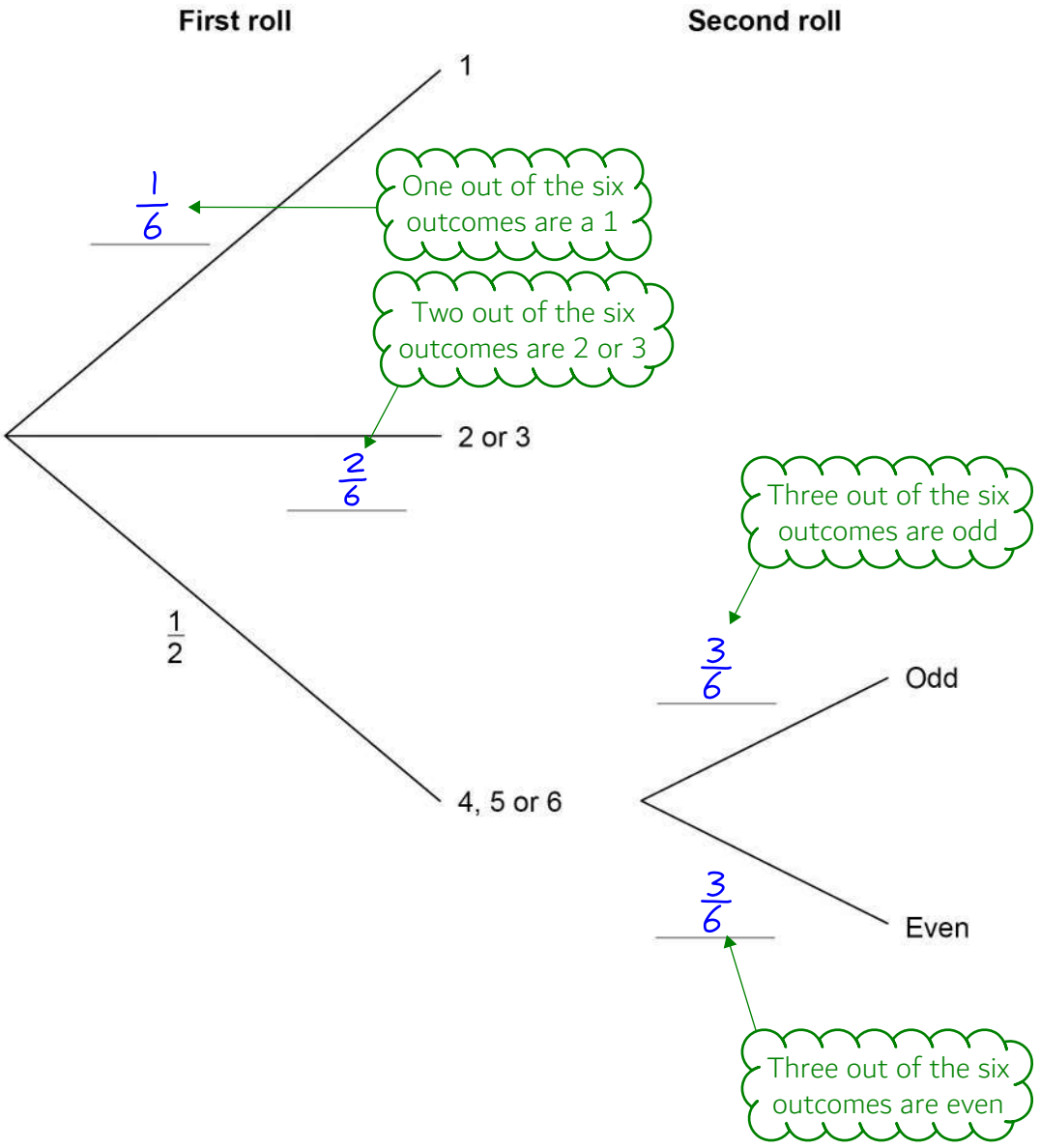
When she has to roll again,

if she rolls an odd number she wins

if she rolls an even number she loses.

21 (a) Complete the tree diagram with the four missing probabilities.

[2 marks]



Do not write outside the box

21 (b) Is Anna more likely to win or to lose?

You **must** work out the probability that she wins.

[4 marks]

$\frac{1}{6} + \frac{1}{2} \times \frac{3}{6}$ ← AND means to multiply, OR means to add. To win, roll a 1 OR roll 4, 5, 6 AND odd. Substituting in the probabilities from the tree diagram gives this

$\frac{2}{12} + \frac{3}{12} = \frac{5}{12}$ ← 1/2 x 3/6 = 3/12 as the numerators and denominators are multiplied. 1/6 is converted into 2/12 by multiplying the numerator and denominator by 2 to make the denominator the same as the 3/12 so they can be added to get 5/12

Lose ← The only outcomes for the game are win or lose. 5/12 is less than half as half of 12 is 6 and 5 is less than this. Therefore the probability of losing must be more than half so will be more likely

Turn over for the next question

6

Do not write outside the box

22 Three friends arrive at a party.

Their arrival increases the number of people at the party by 20%

In total, how many people are now at the party?

[2 marks]

3 x 6

20% of the people is 3. As it has increased by 20%, the number of people is now at 120%. Multiplying 20% by 6 gives 120% so 3 is also multiplied by 6 to find out how many people there are

Answer 18

Do not write outside the box

23 Work out the value of $(3^{12} \div 3^5) \div (3^2 \times 3)$

[3 marks]

$3^7 \div 3^3 = 3^4$

$a^x / a^y = a^{x-y}$
$a^x \times a^y = a^{x+y}$
$3^{12}/3^5 = 3^{12-5} = 3^7$
$3^2 \times 3^1 = 3^{2+1} = 3^3$
$3^7/3^3 = 3^{7-3} = 3^4$

$3^4 = 3 \times 3 \times 3 \times 3 = 9 \times 9 = 81$

Answer 81

24 (a) $a + b = 0$

Which of these is equal to b?
Circle your answer.

As adding a negative is the same as subtracting. a - a = 0

[1 mark]

0 $\quad \frac{1}{a} \quad$ a $\quad -a$

24 (b) $c \times d = 1$

Which of these is equal to d?
Circle your answer.

c x 1/c = c/c
Anything divided by itself is 1

[1 mark]

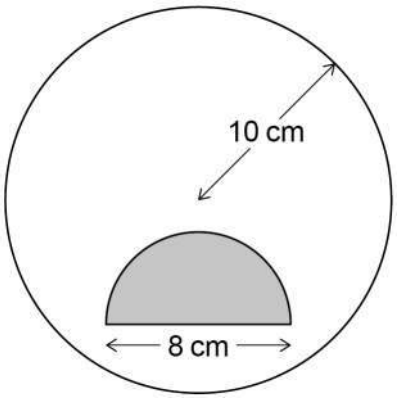
1 $\quad \frac{1}{c} \quad$ c $\quad -c$

7

Do not write outside the box

25 A shaded semicircle is inside a circle as shown.

Not drawn accurately



The **radius** of the circle is 10 cm

The **diameter** of the semicircle is 8 cm

How many times bigger is the unshaded area than the shaded area?

[4 marks]

$\frac{1}{2} \times \pi \times 4^2 = 8\pi$ ← Area of circle = πr^2, where r is the radius. 8cm is the diameter of the semicircle so halving this gets the radius of 4cm. As it is a semicircle, finding half of the area of the full circle finds its area

$\pi \times 10^2 = 100\pi$ ← This works out the area of the circle

$100\pi - 8\pi = 92\pi$ ← This works out the unshaded area

$\frac{92\pi}{8\pi} = \frac{92}{8}$

$8 \overline{)92.^{4}0}$ 11.5

Dividing the unshaded area by the shaded area works out how many times larger it is. π cancels out from the numerator and denominator

Answer 11.5

Do not write outside the box

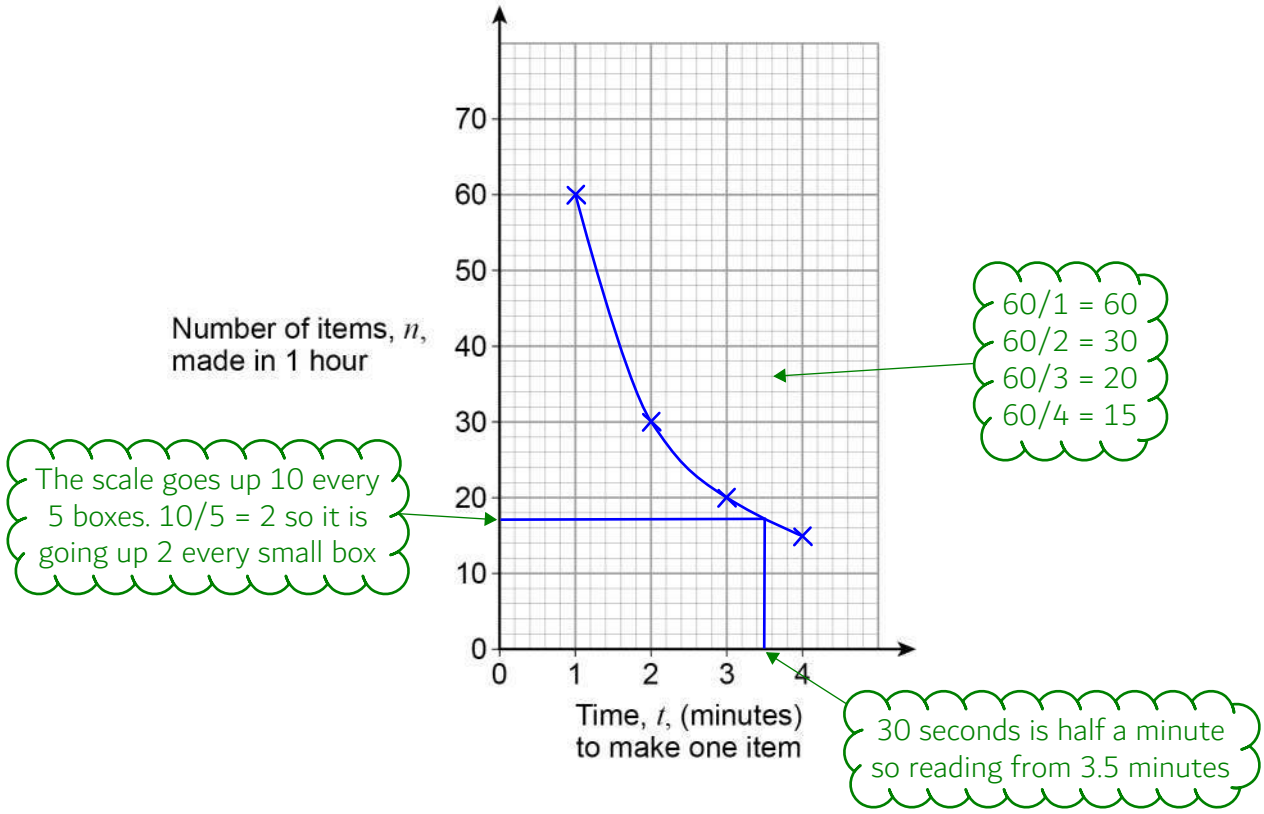
26 The number of items, n, made in 1 hour by a machine is given by $n = \frac{60}{t}$

t is the time in minutes the machine takes to make one item.

The value of t changes for different types of item.

26 (a) On the grid below, draw the graph of $n = \frac{60}{t}$ for values of t from 1 to 4

[2 marks]



26 (b) The machine takes 3 minutes 30 seconds to make one item.

Use your graph to estimate the value of n.

[2 marks]

Answer 17

8

Do not write outside the box

27 Rearrange $x = 2y - 6$ to make y the subject.

[2 marks]

$x + 6 = 2y$ ← Add 6 to both sides to get rid of the -6

Divide both sides by 2 to get rid of the 2

Answer $y = \frac{x+6}{2}$

28 Multiply out and simplify $(x + 5)(x - 1)$

[2 marks]

$x^2 - x + 5x - 5$ ← $x \times x = x^2$, $x \times -1 = -x$, $5 \times x = 5x$, $5 \times -1 = -5$

$-x + 5x = 4x$

Answer $x^2 + 4x - 5$

END OF QUESTIONS

4