.CG Maths.
Worked Solutions

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

F

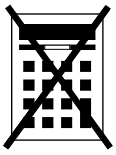
Foundation Tier Paper 1 Non-Calculator

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 the exam.

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

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

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

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4 Circle the calculation which works out half of 12

[1 mark]

$12 \div 0.5$ $\quad 2 \div 12$ $\quad 12 \times \frac{1}{2}$ $\quad 12 \div 50 \times 100$

'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]

$$\begin{array}{r} 364.5 \\ +\ 17.9 \\ \hline 382.40 \\ -\ 2.08 \\ \hline 380.32 \end{array}$$

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]

$$\begin{array}{r} 9.36 \\ \times\ 2 \\ \hline 18.72 \end{array}$$

Using column multiplication

Answer 18.72

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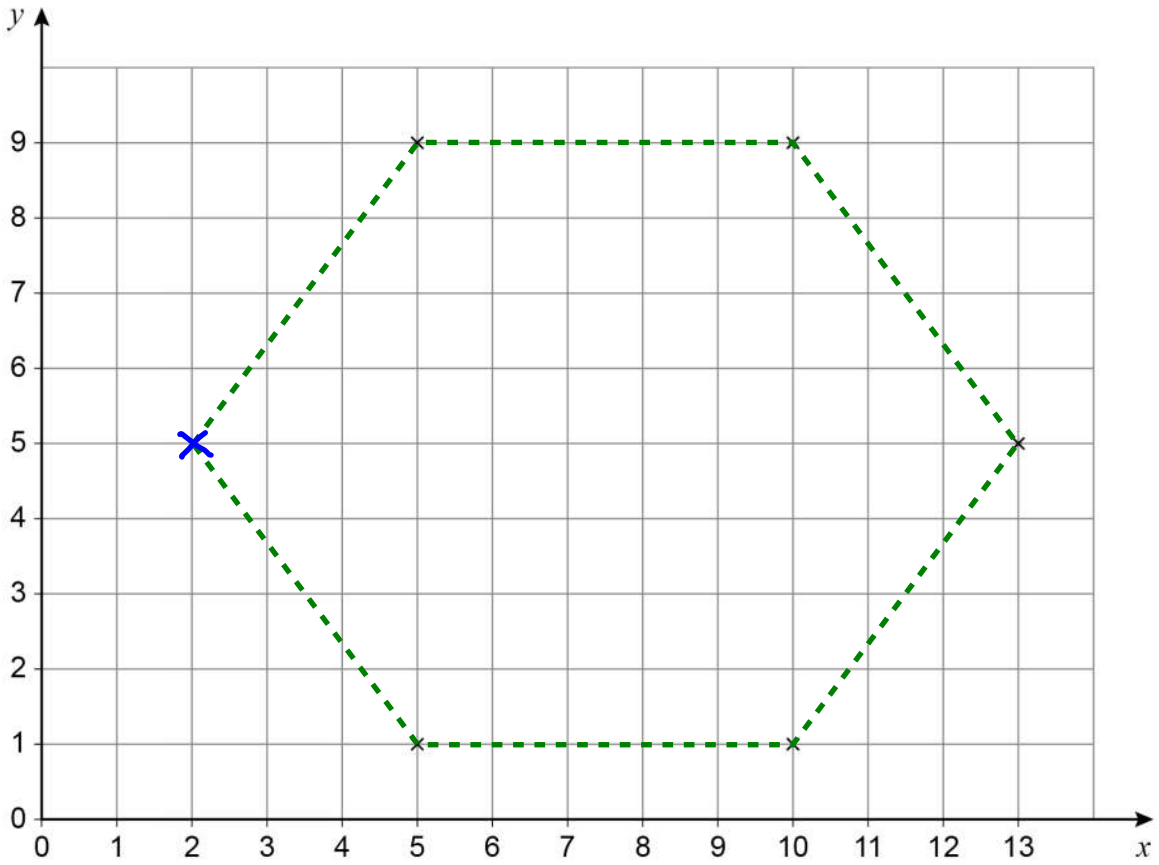
6 Five points are plotted on a centimetre grid.



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)

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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 ← Carly started with £0 so the £7 from Amy add the £5 from Brad works out that Carly now has £12

12+7 ← Amy also now has £12 as now they all have the same amount of money. Adding the £7 she gave to Carly works out that Amy had £19 to begin with

Answer £ 19

Turn over for the next question

4

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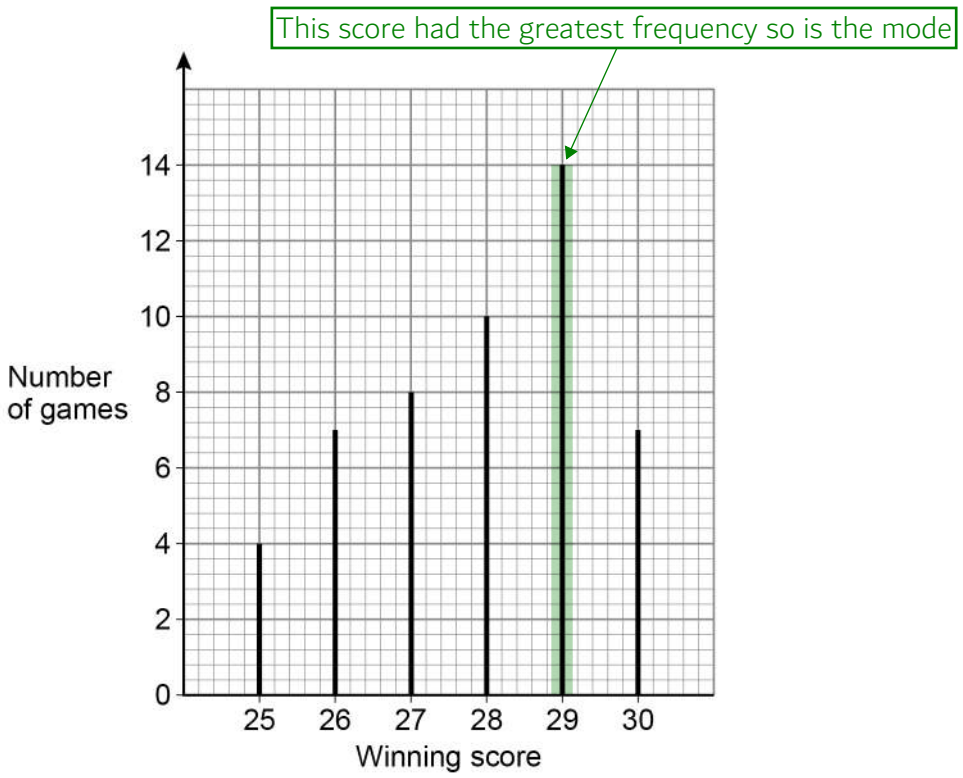
8 A game is played 50 times.

The vertical line chart shows the winning scores.



8 (a) Write down the mode.

[1 mark]

Answer 29

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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 a winning score of 27 or more

Answer $\frac{39}{50}$

39 out of the 50 games had a winning score of 27 or more

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 there are no more to be 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

60 = 12 x 5 and 60 = 15 x 4. It is the lowest number which is both a multiple of 12 and 15

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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. Another coach will be needed for the remaining people so the number of coaches needed is 17

Answer 17

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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
5850

Multiplying the 13 coaches by the £450 for each coach using column multiplication works out that the total cost is £5850

Answer £ 5850

Turn over for the next question

6

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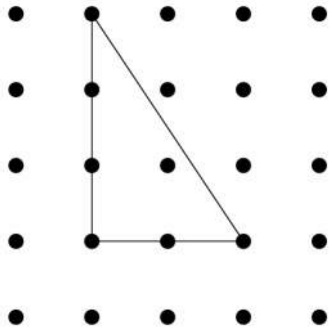
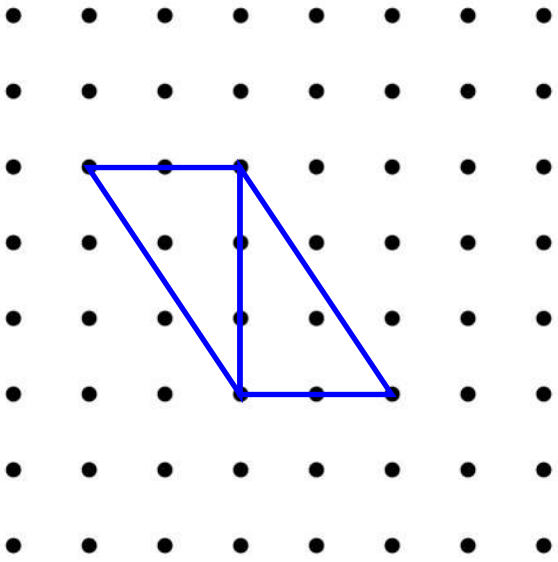
11 Here is a triangle on a square dotty grid.



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

[1 mark]



A parallelogram is a 4-sided shape where the opposite sides are equal and parallel

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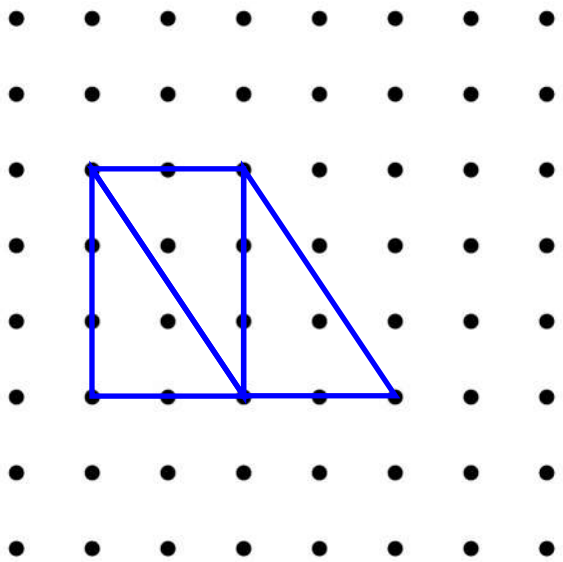
11 (b) On the grid below, show how you can make a trapezium with **three** of these triangles.

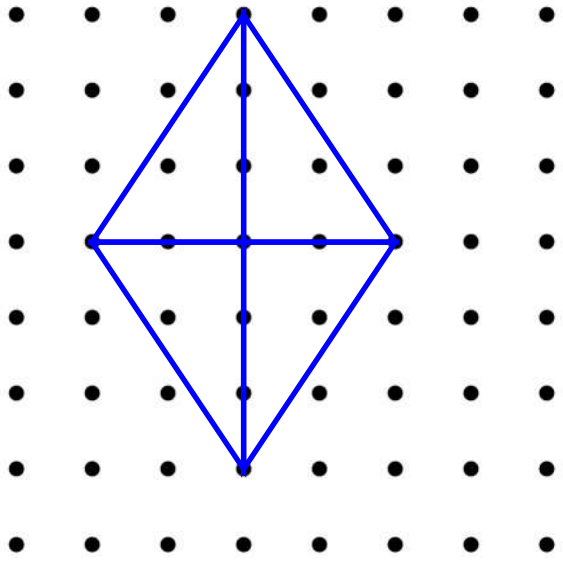
[1 mark]



A trapezium is a 4-sided shape which has 1 pair of parallel sides

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

[1 mark]



A rhombus is a 4-sided shape where all sides are equal

3

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12 Work out 65% of 300

[3 marks]

65
× 3
195

300 ÷ 100 = 3, so 1% of 300 is 3. Then multiplying this by 65 finds that 65% of 300 is 195

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

25
2|50

To do a fraction of an amount, divide the amount by the denominator then multiply the result by the numerator. So first dividing the average score of 50 by the denominator of 2 to get 25

25
× 5
255

Next multiplying the 25 by 5 gives 225

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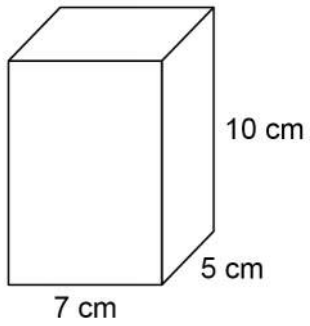
14 Here is a cuboid.



Work out the volume.

[2 marks]

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

Answer 350 cm^3

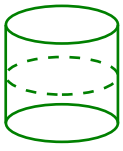
7 x 5 = 35, then 35 x 10 = 350

15 Circle the shape that has a uniform cross section.

[1 mark]

cone sphere (cylinder) pyramid

The same size circle repeats throughout the shape



7

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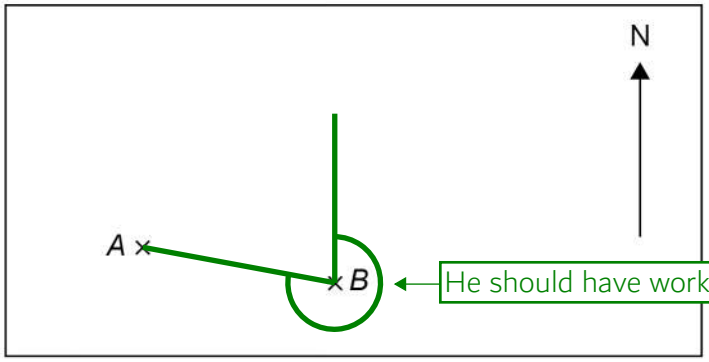
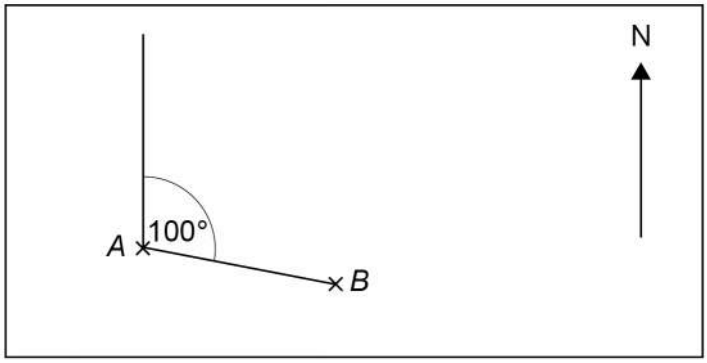
16 (a) Here is a map showing points *A* and *B*.



He should have worked out this angle

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

A bearing is the amount of degrees turned clockwise from north

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

Nina says,

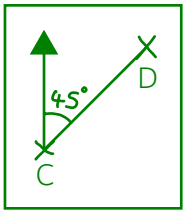
"*D* is North West of *C*."

Is Nina correct?

Give a reason for your answer.

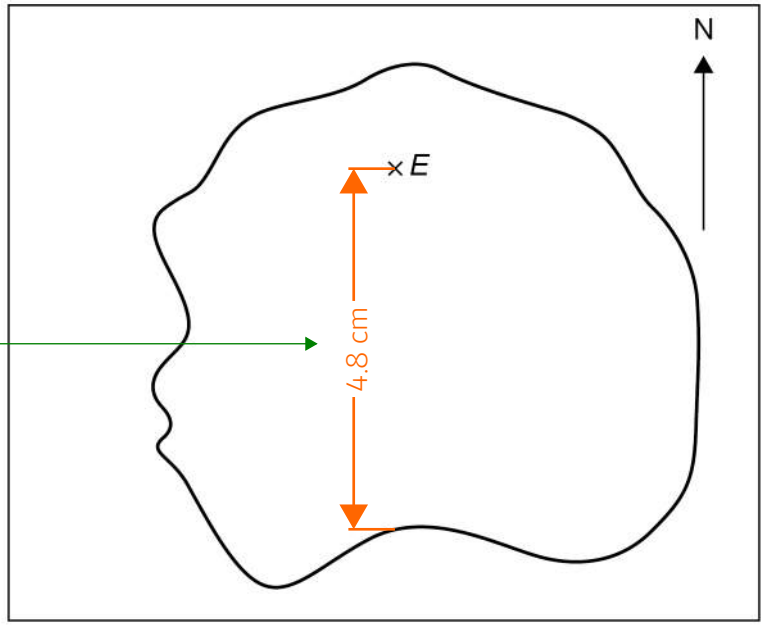
[1 mark]

No, D is North East of C



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

Scale: 1 cm represents 100 km



Measured using a ruler

A plane flies due South from the airport.

How far does it fly until it reaches the sea?

[3 marks]

4.8 × 100 ← There are 4.8 lots of the 1 cm so there will be 4.8 lots of the 100 km

Answer 480 km

5

Turn over ►

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17 (a) Simplify fully 56 : 24

[2 marks]

Answer 7 : 3

Dividing both sides by 8 simplifies the ratio. Both 7 and 3 cannot be divided by the same amount to get smaller whole numbers so the ratio cannot be simplified any further

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

[1 mark]

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

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

17 (c) Share £180 in the ratio 1 : 9

[2 marks]

1+9 ← There is £180 in total so working out that there are 10 parts in total in the ratio which represent this

180 ÷ 10 ← Dividing the £180 by the 10 parts which represent it works out that 1 part of the ratio is worth £18

18 × 9 = 162 ← Multiplying the value of 1 part of the ratio by 9 works out that the 9 parts of the ratio represent £162

Answer £ 18 and £ 162

1 part of the ratio is £18 and 9 parts of the ratio is £162

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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

A comparison can be just stating which is greatest. Using the three headings to make the three comparisons

Turn over for the next question

8

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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 so the value will be half of 10

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 value 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

Answer $9a - 4b + c$

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

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20 (a) Write 0.00097 in standard form.

[1 mark]

Answer 9.7×10^{-4}

It is multiplied by 10 4 times to get 9.7, a number at least 1 and less than 10. So it must be multiplied by 10^{-4} (which basically means divide by 10 4 times) to keep it equal

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 $a^x/a^y = a^{x-y}$
$10^5/10^3 = 10^{5-3} = 10^2$

Answer 75

0.75 multiplied by 10 twice gives 75

Turn over for the next question

7

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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.

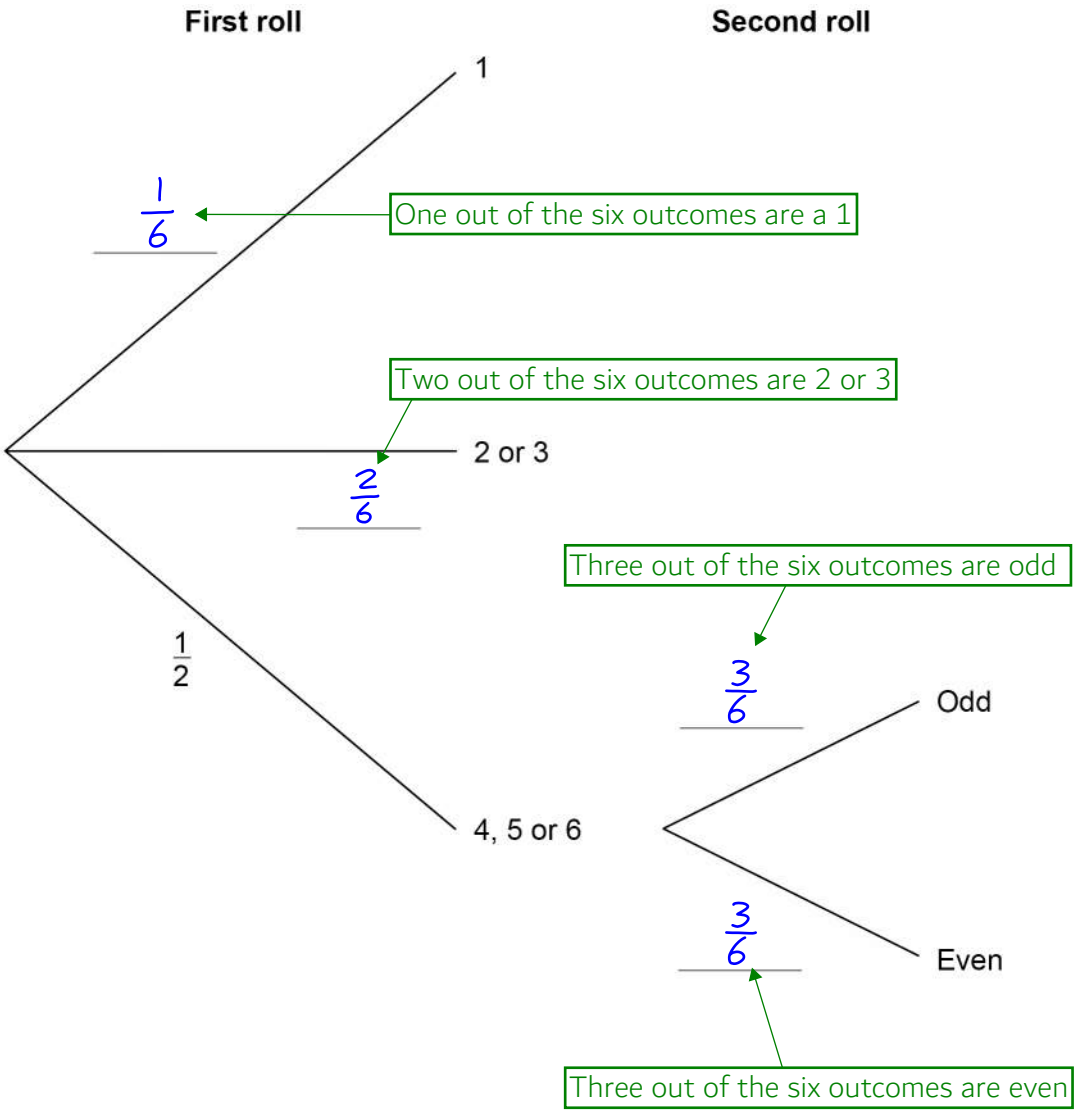
When she has to roll again,

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]



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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 are multiplied and the 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

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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 × 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

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

[3 marks]

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

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

Answer 81

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

24 (a) $a + b = 0$

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

[1 mark]

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

Subtracting a from both sides gives b = -a

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

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

[1 mark]

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

Dividing both sides by c gives d = 1/c

7

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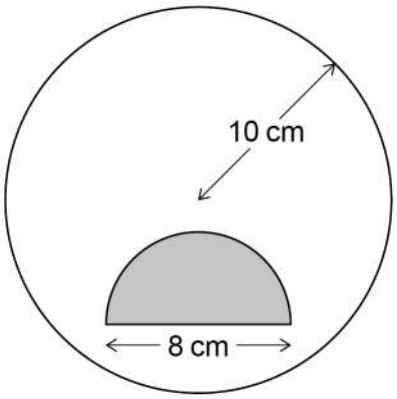
25 A shaded semicircle is inside a circle as shown.

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 = π x radius^2. 8 cm is the diameter of the semicircle so halving this gets the radius of 4 cm. As it is a semicircle, finding half of the area of the full circle finds its area. So the area of the shaded semicircle is 8π cm^2

$\pi \times 10^2 = 100\pi$ ← Area of circle = π x radius^2. 10 cm is the radius of the circle. So the area of the circle is 100π cm^2

$100\pi - 8\pi = 92\pi$ ← Subtracting the area of the shaded semicircle from the area of the circle works out that the unshaded area is 92π cm^2

$\frac{92\pi}{8\pi} = \frac{92}{8}$ ← Dividing the unshaded area by the shaded area works out how many times larger it is. π cancels out from the numerator and denominator

$8\overline{)92.40}$ = 11.5 ← Using short division to convert 92/8 to a decimal

Answer 11.5

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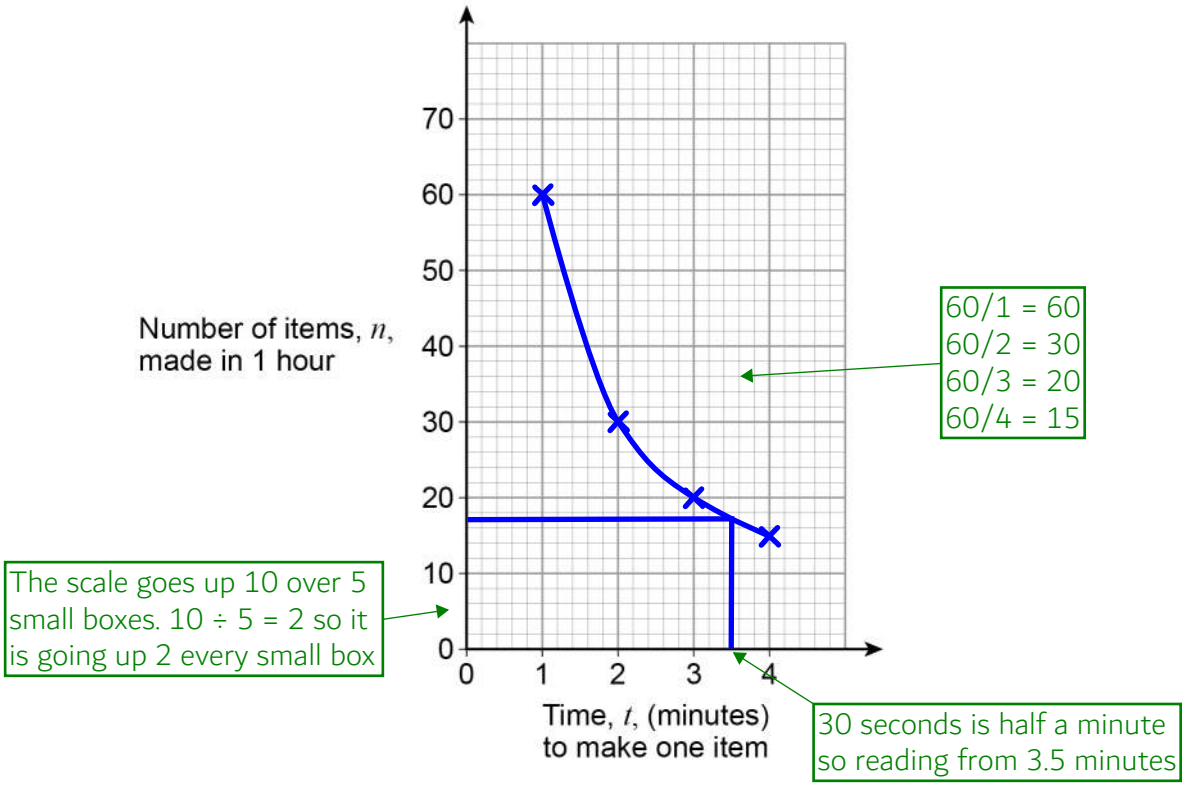
26 The number of items, n, made in 1 hour by a machine is given by $n = \frac{60}{t}$

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

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

[2 marks]

$x+6=2y$ ← Adding 6 to both sides to get rid of the -6 and get the y term on its own

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

↑ Dividing both sides by 2 to get rid of the 2 and get y on its own

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

[2 marks]

$x^2-x+5x-5$ ←

$x \times x = x^2$
$x \times -1 = -x$
$5 \times x = 5x$
$5 \times -1 = -5$

Answer x^2+4x-5

↑ $-x + 5x = 4x$

END OF QUESTIONS

4

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