Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

F

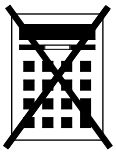
Foundation Tier Paper 1 Non-Calculator

Thursday 24 May 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	
22–23	
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

.CG Maths.

Answer **all** questions in the spaces provided

Do not write outside the box

1 Work out $\frac{1}{2} \times 5$

Circle your answer.

[1 mark]

$\frac{5}{10}$ $2\frac{1}{2}$ $\frac{1}{10}$ $2\frac{1}{5}$

1/2 x 5/1 = 5/2. 2 lots of 2 go into 5 with a remainder of 1.
So the whole number is 2 and the 1 is left in a fraction over 2

2 Circle the number that is 5 **less** than –2

[1 mark]

–10 –7 –3 3

Counting back 5 from -2: -3, -4, -5, -6, -7

3 Simplify $3 \times a \times 3 \times a$

Circle your answer.

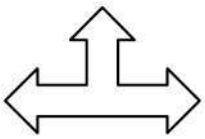
[1 mark]

$9a$ $6a^2$ $9a^2$ $6a$

The multiplication can be done in any order. 3 x 3 x a x a = 9 x a^2

Do not write outside the box

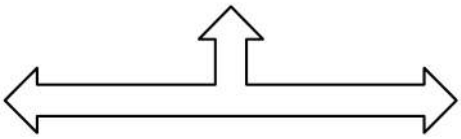
4 Which shape is **similar** to shape X?



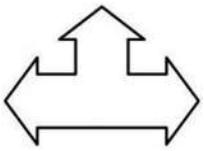
X

Circle the correct letter.

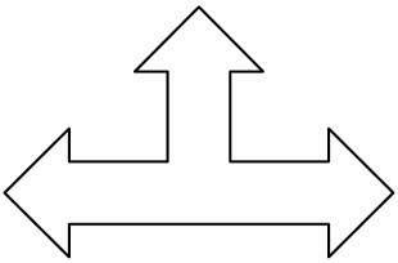
[1 mark]



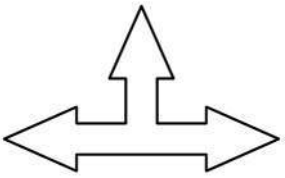
A



B



C



D

C looks the same as shape X. It is just scaled up

4

Do not write outside the box

5 Work out 20% of 14 000

[2 marks]

1400
× 2
2800

10% is 1/10, which can be found by dividing 14000 by 10. This takes off a 0 to give 1400. Multiplying 10% by 2 gives 20% so 1400 is multiplied by 2

Answer 2800

6 (a) Write 0.85 as a fraction in its simplest form.

[2 marks]

17
5|8 3 5
020
5|1'0 0

85 divided by 100 is the same as 0.85 so converting it into a fraction gives 85/100. This can be simplified by dividing both the numerator and denominator by 5. 17 and 20 cannot be divided by the same number any further so cannot be simplified any more

Answer $\frac{17}{20}$

6 (b) Write $\frac{5}{8}$ as a decimal.

[1 mark]

0.625
8|5.⁵0²0⁴0

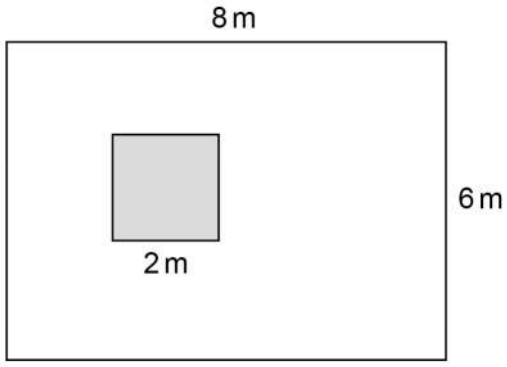
Dividing the numerator by the denominator converts it into a decimal

Answer 0.625

Do not write outside the box

7 A rectangular carpet measures 8 m by 6 m

Part of the carpet is covered by a square rug of length 2 m



Not drawn accurately

Show that $\frac{1}{12}$ of the carpet is covered by the rug.

[2 marks]

$\frac{2 \times 2}{6 \times 8} = \frac{4}{48} = \frac{1}{12}$

Expressing the area of rug as a fraction of the area of the carpet. Area of rectangle = length x width. The length of the carpet is 8m and the width is 6m. Area of a square = length^2. The length of the square is 2m. Simplifying the fraction by dividing both the numerator and denominator by 4

7

Do not write outside the box

8 Sam, Carl and Erik share 40 sweets.

Erik gets the largest share.

What is the **smallest** possible number of sweets that Erik could get?

[2 marks]

13 r1
3|40

Dividing the 40 sweets by the 3 people works out how many each would get. There is 1 remainder which can be given to Erik as he gets the largest share. He would then have 14 and Sam and Carl would have 13

Answer 14

9 The time in Rio is three hours behind London.

The time in New York is five hours behind London.

What is the time in New York when it is 1.00 am in Rio?

[2 marks]

4am

London is 3 hours ahead of Rio so it is 4am in London. 5 hours behind this is 11pm

Answer 11pm

Do not write outside the box

10 Here is a list of numbers.

5	6	1	3	5	5	8	4	2	2
11	12	15	20	25	33	37	39	41	

For part (b)

10 (a) Work out the median.

[2 marks]

1, 2, 2, 3, 4, 5, 5, 5, 6, 8

$2\overline{)9.0}$ → 4.5

Writing the numbers in order then crossing out from both ends until there are two numbers left in the middle. The mean of both of these numbers is the median. 4 + 5 = 9. Dividing this by 2 as there are 2 numbers

Answer 4.5

10 (b) Work out the mean.

[2 marks]

$\frac{41}{10}$

Adding all of the numbers together gives 41. There are 10 numbers so this is divided by 10

Answer 4.1

Turn over for the next question

8

Do not write outside the box

11 300 passengers go on a coach trip.

Each coach takes 50 passengers.

Each passenger pays £25

The table shows the costs for the coach company.

	Cost for each coach
Pay for driver	£90
Fuel	70p per mile

Each coach travels 200 miles.

Work out the **total** profit the company makes from this trip.

[6 marks]

25
×300
7500
Multiplying the 300 passengers by the £25 they each pay works out the income for the trip

006
50|300
Working out how many lots of 50 passengers 300 passengers is. Each lot will need a coach

90
× 6
540
There are 6 coaches and each one needs a driver. This works out the cost of the drivers

200
× 0.7
140.0
× 6
840.0
There is 100p in £1 so dividing 70p by 100 works out that it is 0.7 of a pound. Multiplying this cost per mile by the 200 miles each coach does works out the cost of the fuel for each coach. Multiplying this by the 6 coaches works out the total cost of the fuel

7500
− 540
− 840
6120
Profit = income - outgoings. The income was £7500. The outgoings are the £540 cost for the drivers and the £840 cost for the fuel

Answer £ 6120

Do not write outside the box

12 (a) Work out 16.4 – 3.92 + 7.8

[2 marks]

$$\begin{array}{r} {}^{5}1\cancel{6}.{}^{13}\cancel{4}0 \\ -\ 3.92 \\ \hline 12.48 \\ +\ 7.8 \\ \hline 20.28 \\ {}^{1}\ {}^{1} \end{array}$$

Subtraction and addition can be done in any order so subtracting the 3.92 from the 16.4 first then adding 7.8 to the result

Answer 20.28

12 (b) Work out 2843.61 ÷ 7

[2 marks]

$$\begin{array}{r} 406.23 \\ 7\overline{)2^{2}8\ 4^{4}3.{}^{1}6^{3}1} \end{array}$$

Answer 406.23

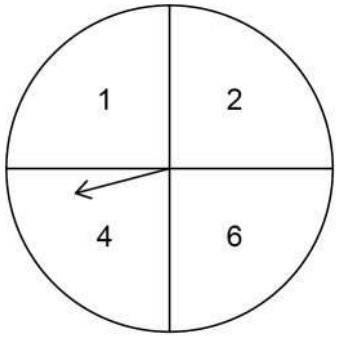
Turn over for the next question

10

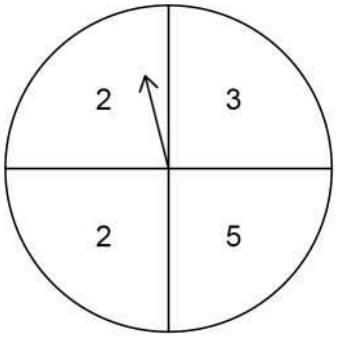
Do not write outside the box

13 In a game, two fair spinners are spun.

Spinner A



Spinner B



If the numbers the arrows land on are different, the score is the **higher** number.

If the numbers the arrows land on are the same, the score is 0

13 (a) Complete the table to show the possible scores.

[2 marks]

		Spinner B		
		2	**2**	**3**	**5**
Spinner A	**1**	2	2	3	5
	2	0	0	3	5
	4	4	4	4	5
	6	6	6	6	6

13 (b) Write down the probability that the score is an **odd** number.

[1 mark]

The scores highlighted in green are odd.
5 out of the 16 possible scores are odd

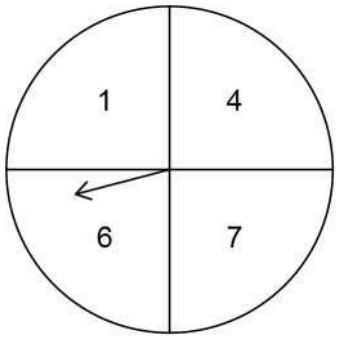
Answer $\frac{5}{16}$

Do not write outside the box

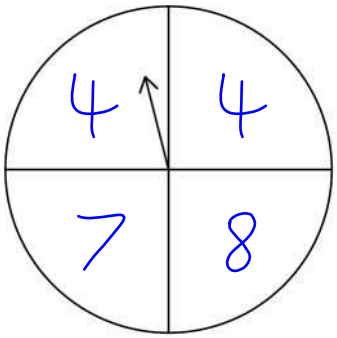
13 (c) The same game is played using spinners C and D.

The numbers on C are shown.

Spinner C



Spinner D



The table shows some of the possible scores.

Spinner C \ Spinner D	4	4	7	8
1	4			
4		0		
6				
7			0	8

Write the missing numbers on spinner D.

[2 marks]

5

Turn over ►

Do not write outside the box

14 2 people working at the same rate will take 6 hours to paint a room.

14 (a) Assuming that they **all** work at this rate,

how long will it take 3 people to paint the room?

[2 marks]

2×6

12÷3

2 people work for 6 hours so 2 lots of 6 hours worth of work will be done. Dividing these 12 hours worth of work by the 3 people works out that each will spend 4 hours

Answer 4 hours

14 (b) In fact, the **third** person works at a faster rate.

How does this affect the time to paint the room?

[1 mark]

Will be less

Time = distance/speed. Going a faster speed means less time

Do not write outside the box

15 $3a + b = 7$ and $6x + 8y = 40$

Show that $9a + 3b$ has a **greater** value than $3x + 4y$

[2 marks]

7×3=21 ← 9a + 3b is 3 times greater than 3a + b

40÷2=20 ← 3x + 4y is half of 6x + 8y

9a + 3b = 21 and 3x + 4y = 20.
21 is greater than 20

Turn over for the next question

5

Do not write outside the box

16 Circle the point that lies on the line $x - 3 = 0$

[1 mark]

(3, 0) (0, 3) (–3, 0) (0, –3)

x = 3 at this point. 3 - 3 = 0 so this works. The other coordinates do not have 3 as their x coordinate and will not work in the equation

17 a is a negative odd number.

Circle the words that describe a^2

[1 mark]

negative and odd negative and even

positive and odd positive and even

a^2 = a x a. Negative x negative = positive. Odd x odd = odd

18 Circle the ratio which is the same as the scale 1 cm represents 1 km

[1 mark]

1 : 100 1 : 1000 1 : 10 000 1 : 100 000

1km is 1000m. There are 100cm in 1m so 1000m is 100000cm. As 1cm represents 100000cm, this must be the scale

Do not write outside the box

19 Circle the percentage that is closest in value to $\frac{1}{3}$

[1 mark]

30% 33% 33.3% 33.4%

$3\overline{)1\,'0\,'0.'0}$ → $0\,3\,3.\dot{3}$

Multiplying 1/3 by 100 converts it into a percentage. This becomes 100/3, which is 33.33333...%

20 Work out $\sqrt{121} - (13 - 5 \times 2)^2$

[3 marks]

$13 - 10$ ← The order of operations, BIDMAS, needs to be followed. So the brackets are resolved first. Within the bracket the multiplication needs to be done first. -5 x 2 = -10

3^2 ← 13 - 10 = 3. The indices come next so the result of the bracket, which was 3, needs to be squared to give 9

$11 - 9$
$-11 - 9$ ← The square root of 121 can be either 11 or -11. Subtracting the 9 from both of these

Answer 2 or -20

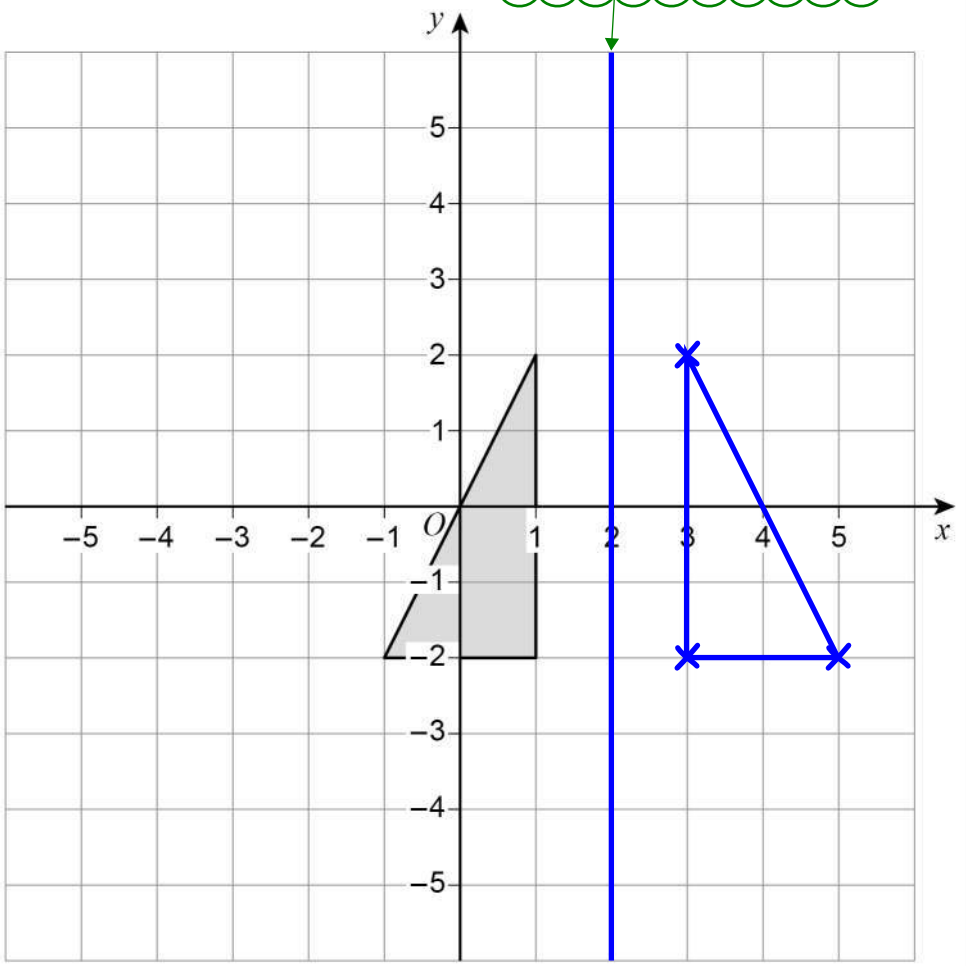
Turn over for the next question

7

Do not write outside the box

21 (a) Reflect the triangle in the line $x = 2$ **[2 marks]**

This is the line of x = 2 as the x coordinate is always 2

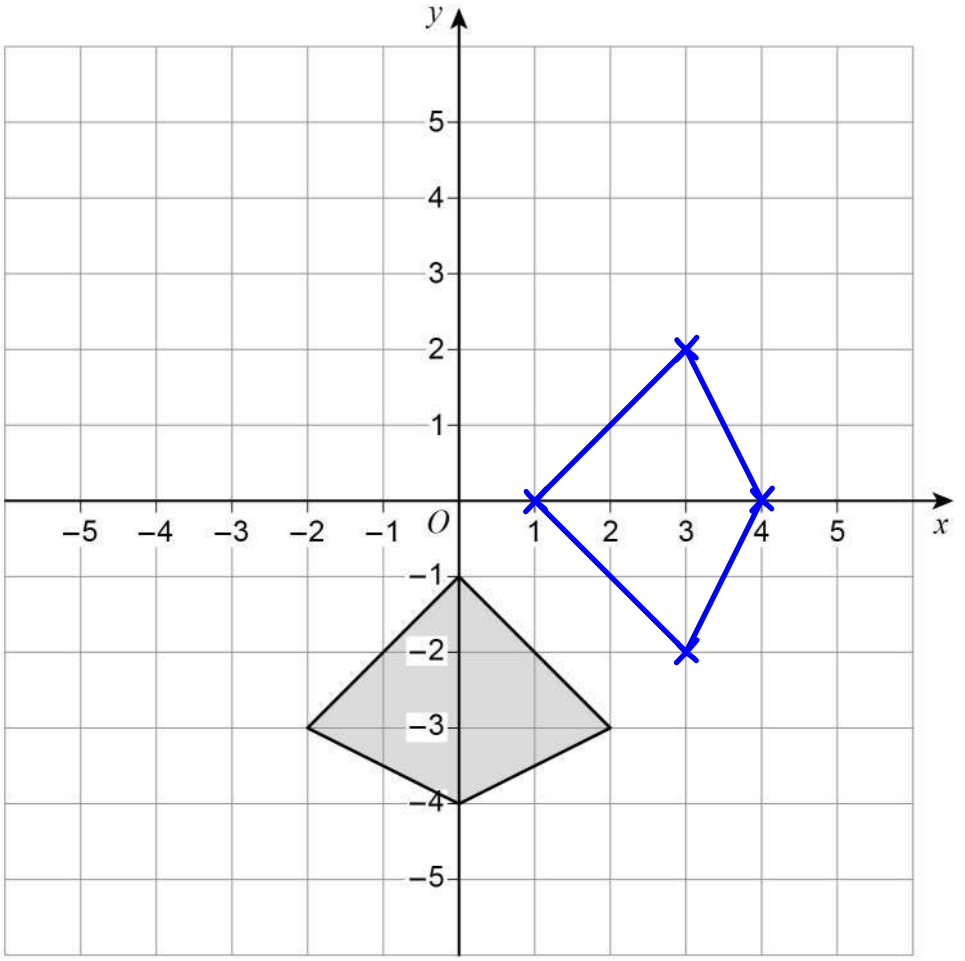


Reflecting each corner by counting the number of jumps to the line and doing the same number on the other side. Then joining up the corners with a ruler to form the triangle

Do not write outside the box

21 (b) Rotate the kite 90° anticlockwise about (0, 0)

[2 marks]



Rotated by using tracing paper to draw around the original shape then putting something sharp in the point (0 , 0) and rotating the paper 90 degrees anticlockwise

Turn over for the next question

4

Do not write outside the box

22 Anna plays a computer game.

Each game is a win or a loss.

She wins three quarters of her first 24 games.

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]

$\frac{3}{4} \times 24$

Working out 3/4 of 24. To multiply by a fraction, divide by the denominator then multiply by the numerator. 24/4 = 6. 6 x 3 = 18

18
+12
30 : 6

She won 18 of the first 24 games then another 12 after that. So 18 + 12 works out that she won 30 games. The rest of the 36 games must have been losses so 6 games must have been lost as 36 - 30 = 6. Expressing the ratio of wins : losses

The ratio of 30 : 6 can be simplified by dividing both sides by 6 to give 5 : 1. It cannot go simpler as 5 and 1 cannot be divided by the same number to get smaller whole numbers

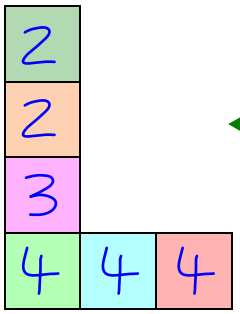
Answer 5 : 1

Do not write outside the box

23 A solid shape is made from centimetre cubes.

Here are the plan, side elevation and front elevation of the shape.

Plan

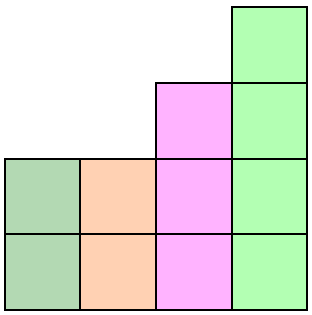


Side elevation

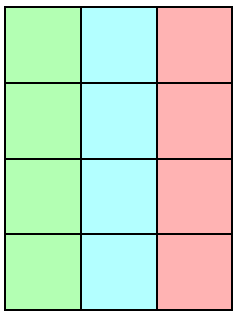
The height of each column on the plan is shown on each square. The colours on the plan correspond to the views on the side and front elevation

Front elevation

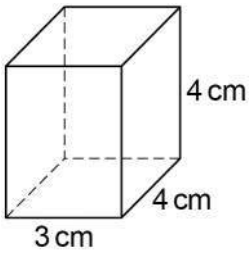
Side elevation



Front elevation



Centimetre cubes are added to make this cuboid.



How many cubes are added?

[3 marks]

4×3×4

Length x width x height works out how many centimetre cubes are in the cuboid

$\overset{3}{\cancel{4}}\overset{1}{8}$
-19
29

There are 48 centimetre cubes in the cuboid. Subtracting the total number of centimetre cubes currently in the solid shape (which is 2 + 2 + 3 + 4 + 4 + 4 = 19) works out that 29 centimetre cubes need to be added

Answer 29

6

Do not write outside the box

24 Divide 405 in the ratio 4 : 11

[3 marks]

$15 \overline{)405}$ = 27

There is 405 in total and this is represented by 15 parts as 4 + 11 = 15. Dividing the 405 by 15 works out the value of 1 part

15, 30, 45, 60, 75, 90, 105

Listing out the 15 times table helps with dividing by 15

$27 \times 4 = 108$

1 part is worth 27. Multiplying this by 4 works out the value of 4 parts

$27 \times 11 = 27 + 270 = 297$

1 part is worth 27. Multiplying this by 11 works out the value of 11 parts

Answer 108 and 297

25 The height of Zak is 1.86 metres.

The height of Fred is 1.6 metres.

Write the height of Zak as a fraction of the height of Fred.

Give your answer in its simplest form.

[3 marks]

$\frac{1.86}{1.6} = \frac{186}{160}$

Putting the height of Zak over the height of Fred expresses the fraction. Multiplying the numerator and denominator by 100 eliminates the decimals and makes it simpler

$2 \overline{)186} = 93$

$2 \overline{)160} = 80$

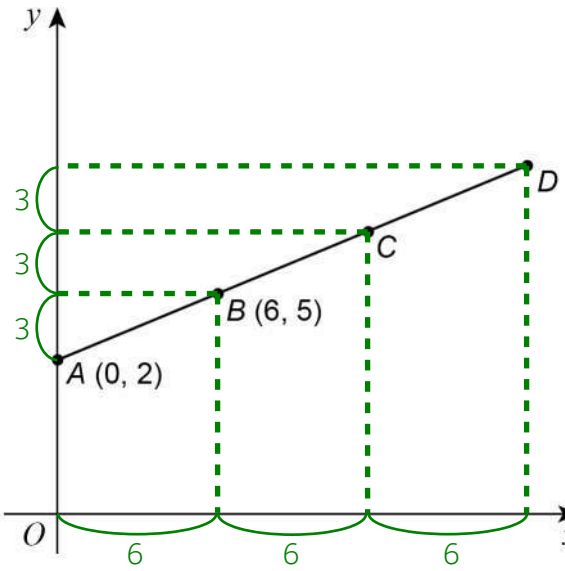
Both the numerator and denominator are even so they can both be divided by 2 to get smaller whole numbers

Answer $\frac{93}{80}$

93 and 80 cannot be divided by the same amount to get smaller whole numbers so the fraction does not go any simpler

Do not write outside the box

26 *A* (0, 2) and *B* (6, 5) are points on the straight line *ABCD*.



Not drawn accurately

AB = *BC* = *CD* ← Therefore all of the points are equally spaced out

Work out the coordinates of *D*.

[3 marks]

As all the points are equally spaced out and are on a straight line, the change in x and y between each point must be the same. From A to B the x coordinate changed by 6 from 0 to 6. So it changes by another 6 twice to get from B to D. 6 + 6 + 6 = 18. From A to B the y coordinate changed by 3 from 2 to 5. So it changes by another 3 twice to get from B to D. 5 + 3 + 3 = 11

Answer (18 , 11)

Turn over for the next question

9

Do not write outside the box

27 A coin is thrown 50 times.

It lands on heads 31 times.

27 (a) Write down the relative frequency it lands on heads.

[1 mark]

Answer $\frac{31}{50}$

31 out of the 50 throws were heads

27 (b) Raj says,

"The coin is biased towards heads."

Use the data to give a reason why he might be correct.

[1 mark]

It was heads for more than half of the throws

28 Solve $5(x + 3) < 60$

[2 marks]

$x+3<12$ ← Dividing both sides by 5

Subtracting 3 from both sides

Answer $x < 9$

Do not write outside the box

29 The range of a set of numbers is $15\frac{1}{4}$

The smallest number is $-2\frac{7}{8}$

Work out the largest number.

[3 marks]

$\frac{61}{4} - \frac{23}{8}$

Converting both mixed fractions into improper fractions by multiplying the whole numbers by the denominators then adding the results to the numerators. The range is the distance between the largest and smallest so adding the range to the smallest number works out the largest number. -23/8 + 61/4 is the same as 61/4 - 23/8

$61 \times 2 = 122$

Multiplying the numerator and denominator of 61/4 by 2 to get the denominators the same. Once this is done the numerators can be subtracted

$\frac{122}{8} - \frac{23}{8}$

Answer $\frac{99}{8}$

30 y is inversely proportional to x.

Complete the table.

[2 marks]

x	12	6	3
y	2	4	8

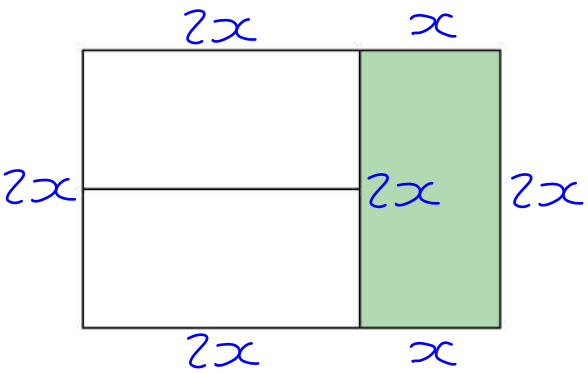
x doubled from 6 to 12 so y must half from 4 to 2.
y doubled from 4 to 8 so x must half from 6 to 3

Turn over for the next question

9

Do not write outside the box

31 A large rectangle is made by joining three identical small rectangles as shown.



Not drawn accurately

Let x be the shorter edge of each small rectangle. The longer edge on each small rectangle must be 2x

The perimeter of one small rectangle is 15 cm

Work out the perimeter of the large rectangle.

[4 marks]

$6x = 15$ ← The perimeter of one small rectangle is x + x + 2x + 2x = 6x which must equal to 15

$x = \frac{15}{6}$ ← Dividing both sides by 6 works out x

$6\overline{)15^{3}0}\ 025$ ← The perimeter of the large rectangle is 2x + x + 2x + x + 2x + 2x = 10x. 10 x 15/6 = 150/6. Dividing 150 by 6 works out the perimeter

Answer 25 cm

Do not write outside the box

32 Put these numbers in order from smallest to largest.

8×10^{-4} 4×10^{-2} 6×10^{-4} 0.07

[2 marks]

0.0008, 0.04, 0.0006

x 10^{-n} means to divide by 10 n times. Converting the standard form into ordinary form allows the numbers to be easily compared

Smallest 6×10^{-4}

8×10^{-4}

4×10^{-2}

Largest 0.07

END OF QUESTIONS

6