AQA

.CG Maths.
Hints

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

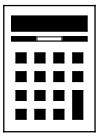
F

Foundation Tier Paper 2 Calculator

Thursday 8 November 2018 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.



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	
26–27	
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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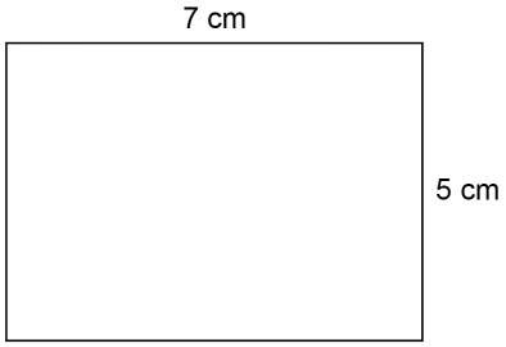
Answer **all** questions in the spaces provided

Do not write outside the box

1 Here is a rectangle.

Not drawn accurately



Work out the perimeter.

Circle your answer.

[1 mark]

12 cm 24 cm 35 cm 70 cm

Perimeter is all of the sides on the outside added together.
Don't forget the two sides not labelled with lengths

2 Circle the number **greater** than –0.9

[1 mark]

–0.901 –0.89 –0.91 $-\frac{9}{10}$

To be greater, it has to be less negative

Do not write outside the box

3 Simplify $8x - 3 + 6x$

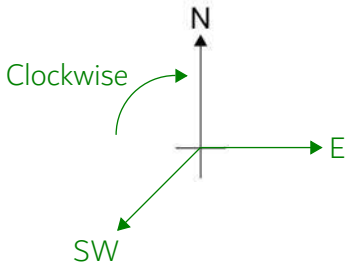
Circle your answer.

[1 mark]

$2x - 3$ $11x$ $5 + 6x$ $14x - 3$

Collect the like terms. 8x + 6x - 3.
The -3 stays separate to the x terms

4 What is the angle of turn clockwise from South West to East?



Circle your answer.

[1 mark]

45° 135° 225° 315°

Turn over for the next question

4

Do not write outside the box

5 Lucy works for 37 hours per week.

Her weekly wage is £303.40

She receives a pay increase of 25p per hour.

Work out her new weekly wage.

[2 marks]

She earns an extra £0.25 each hour for 37 hours. Work out how much extra money this is and add this to the original weekly wage to work out the new weekly wage

Answer £ _____

Do not write outside the box

6 (a) Complete the bank statement.

[3 marks]

Date	Description	Credit (£)	Debit (£)	Balance (£)
01/09/18	Starting balance			1140.79
06/09/18	Car repairs		256.00	
17/09/18	Gas bill		87.31	
24/09/18	Salary	2069.75		

Consider what credit and debit mean by thinking what the description would mean. Are car repairs and gas bill going to be money gained or spent?

6 (b) Write down the meaning of 'Debit' as used in the bank statement.

[1 mark]

Turn over for the next question

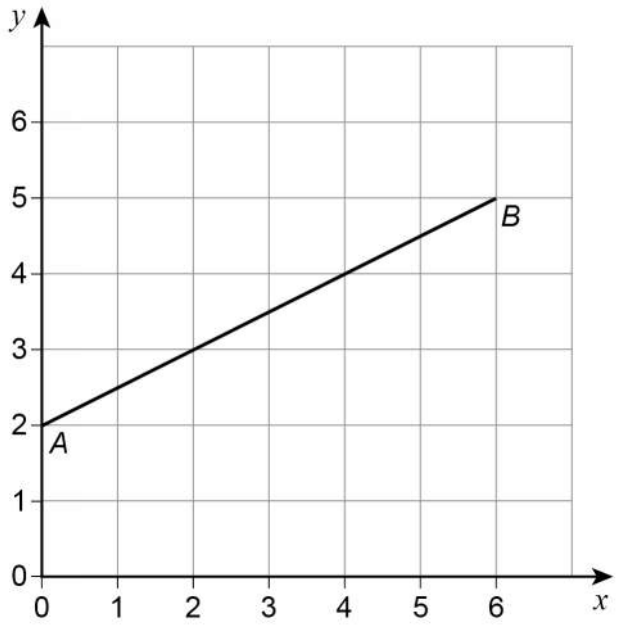
6

Do not write outside the box

7 Line AB is shown on the grid.

A is the point (0, 2)

B is the point (6, 5)



7 (a) Work out the coordinates of the midpoint of the line AB.

[1 mark]

Answer (_____ , _____)

The midpoint is halfway between A and B. It can be found visually using the graph above

Do not write outside the box

7 (b) *C* is another point on *AB*.

C is closer to *B* than to *A*.

The coordinates of *C* are whole numbers.

Work out the coordinates of *C*.

[1 mark]

Answer (_____ , _____)

Find a point on the right of the midpoint which is on the grid lines

7 (c) On the grid, draw a line from point (0, 0) that is

parallel to *AB*

and

two thirds as long as *AB*.

[2 marks]

The line must have the same gradient (going in the same direction). Split line AB into 3 equal parts. The line needs to be as long as 2 of these parts

Turn over for the next question

4

Do not write outside the box

8 Lena is at the gym.

8 (a) She will use each of these pieces of equipment once.

Rowing machine (R)	Stepper (S)
Treadmill (T)	Bike (B)

Lena will use the rowing machine **first**.

List all the possible orders in which she could use the four pieces of equipment.

[2 marks]

RSTB
RSBT

Do not write outside the box

8 (b) The table shows how long Lena spends on each piece of equipment.

Rowing machine	15 minutes
Stepper	13 minutes
Treadmill	35 minutes
Bike	1 hour 30 minutes

Lena starts on the rowing machine at 1.50 pm

She has a break for 4 minutes between pieces of equipment.

What time does she finish on her last piece of equipment?

[3 marks]

1:50+0:15

1°50° + 0°15°

°,,, Press the button on the left to get the °

All the times taken for the equipment and breaks can be added to the start time

Answer _____

5

Turn over ►

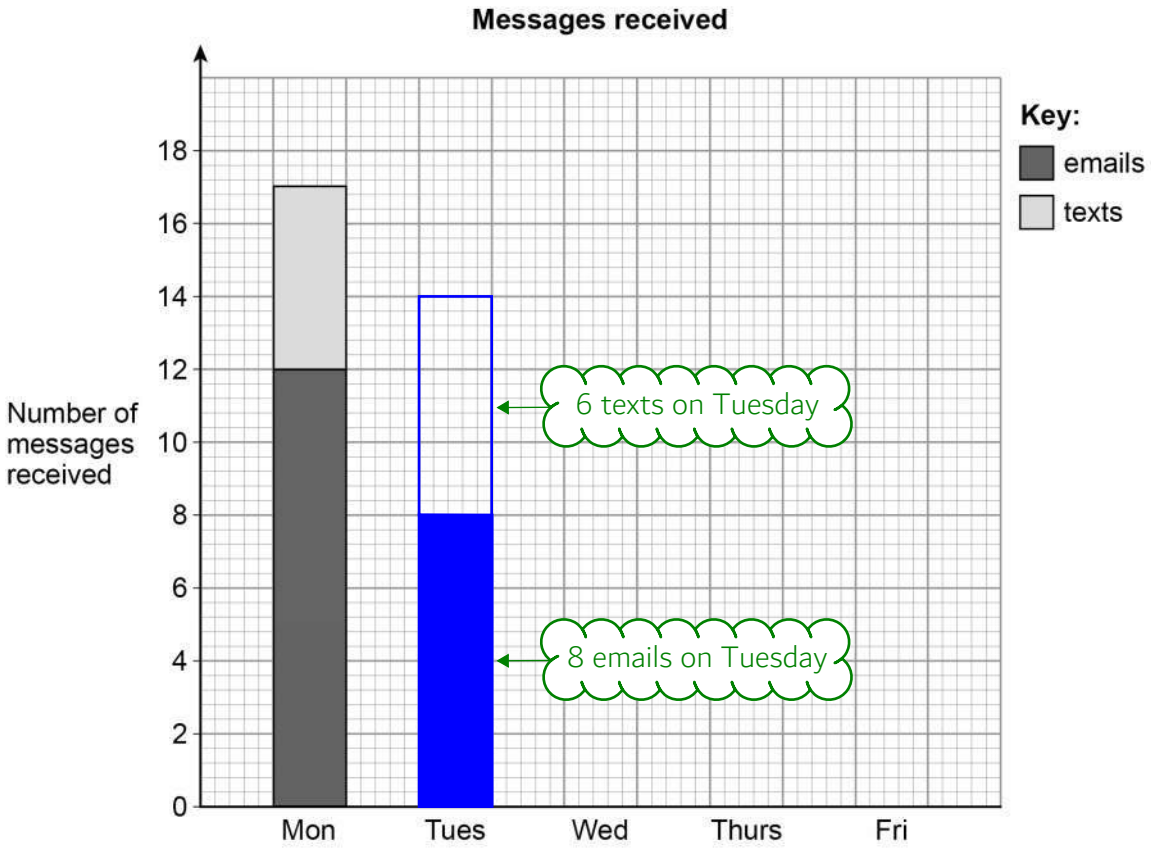
Do not write outside the box

9 The table shows the number of messages Sam received each day for five days.

	Messages	
	Number of emails	**Number of texts**
Monday	12	5
Tuesday	8	6
Wednesday	10	3
Thursday	6	6
Friday	12	4

9 (a) Sam draws a composite bar chart to represent the data.

He has drawn the bar for Monday.



Complete the chart.

[2 marks]

Do not write outside the box

9 (b) In total, what fraction of the messages were emails?

Give your answer in its simplest form.

[3 marks]

Express the total amount of emails as a fraction of the total amount of emails and texts combined

Typing it into the calculator simplifies the fraction

Answer _____

10 Each side of a square is made 3 times as long.

What happens to the perimeter?

Circle your answer.

[1 mark]

× 3 × 6 × 9 × 12

Work out the perimeter of a square with side length of 1cm (all four sides are the same length). Then times the side lengths by 3 and work out the perimeter again.

Turn over for the next question

6

Do not write outside the box

11 Here is a list of ingredients needed to make 6 pancakes.

Flour	120 grams
Eggs	2
Milk	210 millilitres

11 (a) Complete the list of ingredients needed to make 9 pancakes.

[3 marks]

First work out how much is needed for 1 pancake

Flour	
Eggs	
Milk	

11 (b) Convert 210 millilitres to fluid ounces.

Use 1 fluid ounce = 28.4 millilitres

Give your answer to 1 decimal place.

[2 marks]

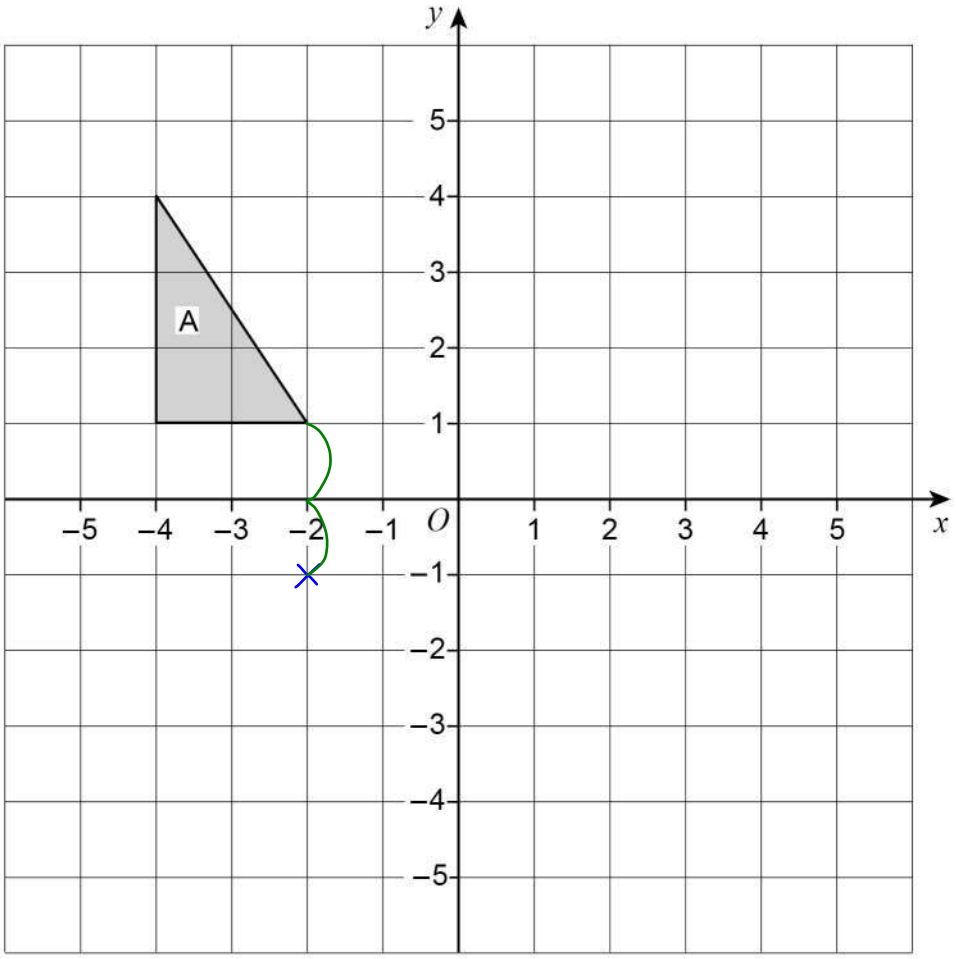
Every 28.4 millilitres is 1 fluid ounce. Work out how many lots of 28.4 go into 210

Answer _____ fluid ounces

Do not write outside the box

12 Reflect shape A in the x-axis.

[2 marks]



Reflect the corners first. Count the number of jumps to the x-axis then do the same amount of jumps on the other side

Turn over for the next question

7

Do not write outside the box

13 A charity sends an appeal letter to 3000 people.

The letter asks for a donation of money.

Here is some information about the last appeal letter the charity sent out.

$\frac{1}{2}$ of the people who were sent the letter made a donation.
The average donation was £8.60
$\frac{1}{3}$ of the people who made a donation filled in a tax form. The government adds 25% to the donations of these people.

13 (a) Using this information,

work out the amount the charity can expect to receive from this appeal.

[6 marks]

Work out how many people made a donation. Multiply this number by the average donation to work out an estimate of how much was donated.

Work out 25% of the average donation and multiply this by the number of people who filled in a tax form to find an estimate of what the government adds.

Add what the government adds to what was donated to work out the amount the charity can expect to receive

Answer £_____

Do not write outside the box

13 (b) The average donation from the people who filled in a tax form was more than £8.60

How does this affect your answer to part (a)?

Tick **one** box.

☐ It should be lower

☐ It should be higher

☐ It should stay the same

Give a reason.

[1 mark]

25% of a higher amount will be more.

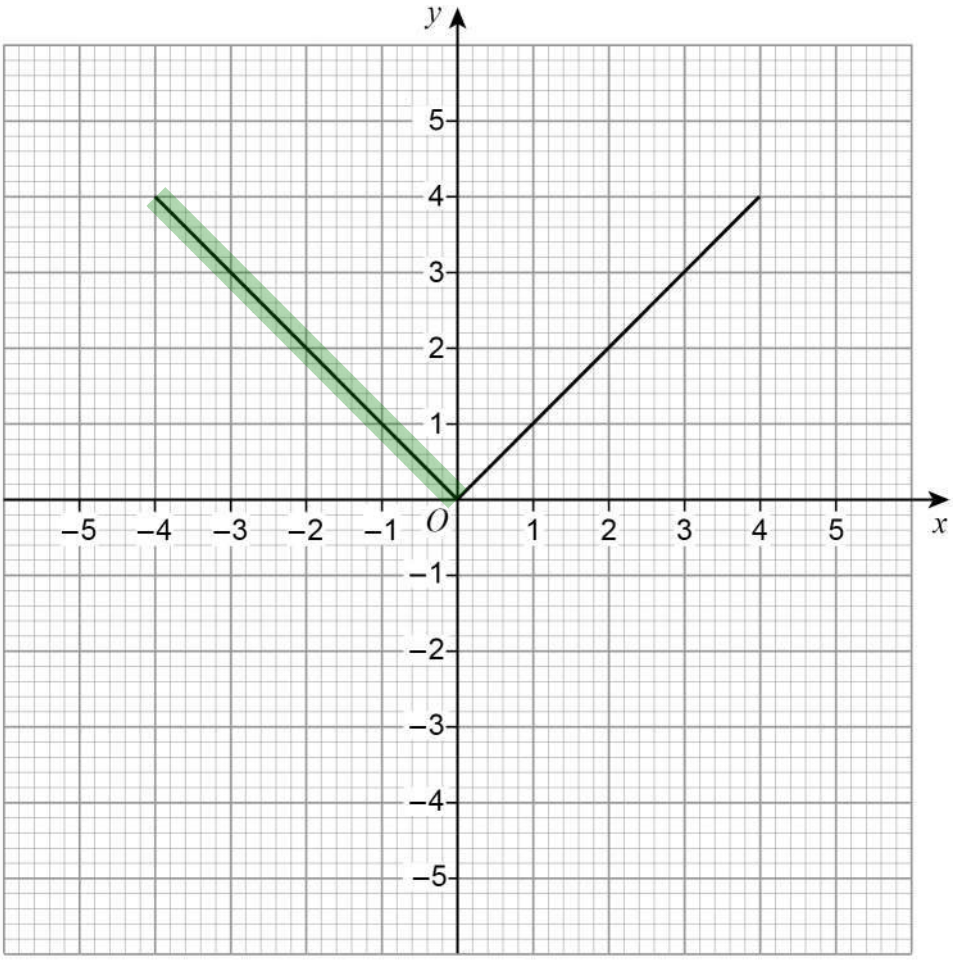
Turn over for the next question

7

Do not write outside the box

14 Lee wants to draw the graph of $y = x$ for values of x from –5 to 5

Here is his graph.



Make two **different** criticisms of his graph.

[2 marks]

Criticism 1 _____

_____

_____

Criticism 2 _____

_____

_____

Do not write outside the box

15 A company uses this formula to work out the cost, £A, of a taxi ride.

$$A = 4 + 1.8m + b$$

£4 is a fixed charge

m is the number of miles travelled

£b is a charge for booking online

15 (a) Clare books a taxi online and travels 8 miles.

She pays £20 altogether.

How much is the charge for booking online?

[3 marks]

Rearrange the equation to make b the subject.
Then substitute in 20 for A and 8 for m

Answer £ _____

15 (b) A different company

has a fixed charge of £3

charges £1.90 per mile

has no charge for booking online.

Write a formula for the cost, £C, of a taxi ride with this company.

[1 mark]

Answer C =

Cost is £3 plus £1.90 per mile

6

Do not write outside the box

16 What does (A ∩ B) represent in P(A ∩ B) ?

Circle your answer.

[1 mark]

The intersection of A and B

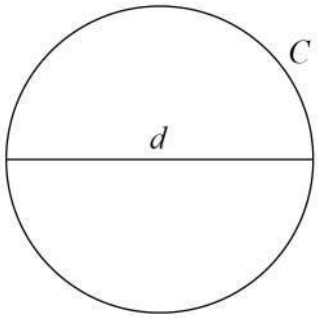
A or B or both

A but not B

not A and not B

A and B

17 A circle has circumference C and diameter d.



$C = kd$

What **value** does the constant k represent?

[1 mark]

Answer _____

Circumference = π x diameter

Do not write outside the box

18 There are 240 cows on a farm.

18 (a) On the farm,

number of bulls : number of cows = 1 : 30

How many bulls are there?

[1 mark]

30 parts represent the number of cows. Dividing it by 30 works out 1 part, which represents the number of bulls

Answer _____

18 (b) Assume

the 240 cows produce milk for 10 months each year

each cow produces an average of 25 litres of milk per **day**.

Estimate the total milk production, in litres, of the 240 cows in one year.

You **must** show your working.

[4 marks]

Work out how much would be produced in a day. Then scale this up to a month (there are roughly 30 days in each month). Then scale this up to 10 months

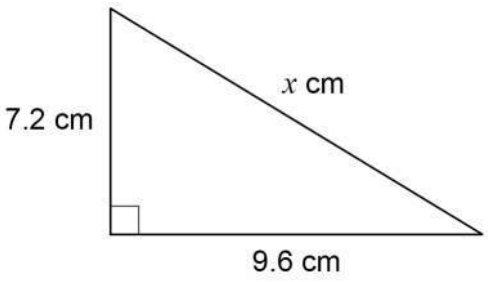
Answer _____ litres

7

Do not write outside the box

19 Here is a right-angled triangle.

Not drawn accurately



Show that $x = 12$

[2 marks]

Pythagoras' Theorem can be used to work out the missing side. $a^2 + b^2 = c^2$, where c is the longest side and a and b are the two shorter sides. x is the longest side, so rearrange to make c the subject

Do not write outside the box

20 Work out the values of a and b in the identity

$$5(7x + 8) + 3(2x + b) \equiv ax + 13$$

[4 marks]

Expand the brackets then equate the coefficients. There must be the same amount of x and constants on the left as on the right

$a =$ _____ $b =$ _____

21 The first four terms of a linear sequence are

7 11 15 19

Circle the expression for the nth term.

[1 mark]

$n + 6$ $4n + 3$ ~~$7n + 4$~~ $n + 4$

Try each sequence by listing what terms would be in them. n is 1 on the first term, then 2 on the second term... It can't be this one as the first term would be 7(1) + 4 = 11, not 4

7

Do not write outside the box

22 Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leqslant t < 5$	12		
$5 \leqslant t < 10$	7		
$10 \leqslant t < 15$	1		
$t \geqslant 15$	0		

There are no trains in this category so it can be ignored

Each category has a range of 5. Dividing 5 by 2 then adding this on to each of the lowest number in each category works out the midpoints

22 (a) Work out an estimate of the mean number of minutes late.

[3 marks]

Mean = total/number. An estimate of the total is found by multiplying the midpoint by the frequency for each category then adding them all together. The number is the total number of trains

Answer _____ minutes

Do not write outside the box

22 (b) The station manager looks at the information in more detail.

Number of minutes late, t	Number of trains
$0 \leqslant t < 2$	12
$2 \leqslant t < 4$	0
$4 \leqslant t < 6$	7
$6 \leqslant t < 8$	0
$8 \leqslant t < 10$	0
$10 \leqslant t < 12$	1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?
Tick **one** box.

[1 mark]

☐ Higher than part (a)

☐ Same as part (a)

☐ Lower than part (a)

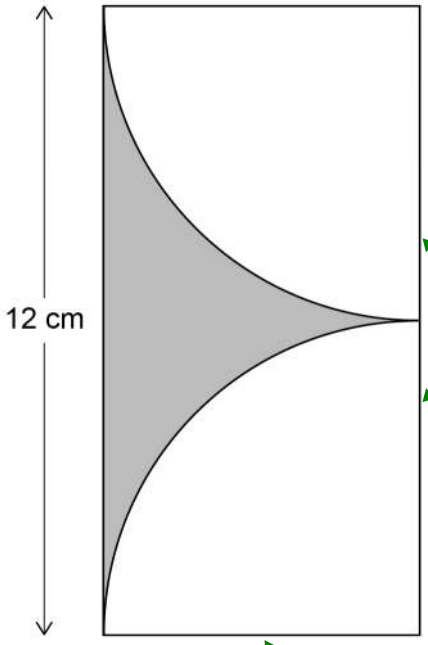
☐ Not possible to tell

The midpoints of the categories for the 12, 7 and 1 trains are lower

4

Do not write outside the box

23 Two identical quarter circles are cut from a rectangle as shown.



Not drawn accurately

Two radii are 12cm in length

This length is a radius

Work out the shaded area.

[4 marks]

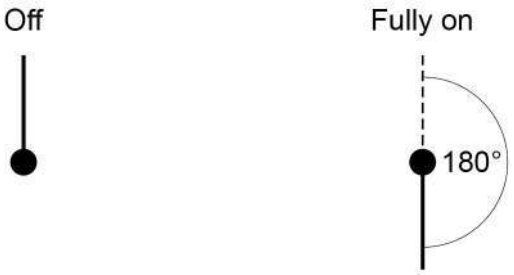
Subtracting the area of the two quarter circles from the area of the rectangle leaves the shaded area.
Area of rectangle = length x width.
Area of circle = πr^2, where r is the radius.
Find a quarter of the area of the full circle to find the area of the quarter circle

Answer _____ cm^2

Do not write outside the box

24 The diagrams show the position of a tap when off and fully on.

The tap is fully on when the angle of turn is 180°



When fully on, water flows out of the tap at 14 litres per minute.

The rate at which water flows out is in direct proportion to the angle of turn.

The tap is turned 135°

The water flows into a tank with a capacity of 79.8 litres.

Will it take **less than** $7\frac{1}{2}$ minutes to fill the tank?

You **must** show your working.

[4 marks]

s d t

This is basically a speed distance time problem as the rate it is filled is the speed, the capacity is the distance and we are trying to calculate the time. From the formula triangle, time = distance/speed

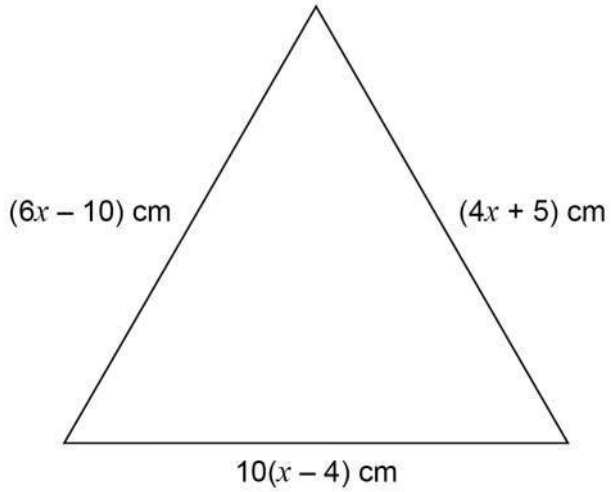
To work out the rate it is filled, express the number of degrees the tap is turned as a fraction of the number of degrees when it is fully on. Work out this fraction of the 14 litres per minute

8

Turn over ►

Do not write outside the box

25 This triangle is equilateral.



Not drawn accurately

Is the perimeter of the triangle greater than one metre?

You **must** show your working.

[5 marks]

The triangle is equilateral so all the sides are equal. Setting two of the sides equal to each other creates an equation in terms of x which can be solved.

Once x is found, substitute it into one of the expressions for the side lengths to work out the value of the length. Use this to calculate the perimeter in centimetres.

Convert the one metre into centimetres and compare it to the perimeter we have calculated

Do not write outside the box

26 An approximation for the value of π is given by

$$4\left(1-\frac{22}{57}+\frac{22}{85}-\frac{22}{105}+\frac{22}{117}-\frac{22}{242}\right)$$

Use your calculator to show that this approximation is within 0.1 of 3.14

[2 marks]

Type the approximation into the calculator exactly as it looks above

Subtracting the approximation from 3.14 works out the difference. As this is less than 0.1, it is within 0.1 of 3.14

27 Work out $\dfrac{9.12\times10^{10}}{3.2\times10^{4}}$

Give your answer in standard form.

[2 marks]

Type it into the calculator exactly as it is above

To be in standard form, it needs to be in the form $a \times 10^{n}$, where $1 \leq a < 10$ and n is an integer

Answer _____

END OF QUESTIONS

9