



Please write clearly in block capitals.

Centre number

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Candidate number

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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	



N 0 V 1 8 8 3 0 0 2 F 0 1

IB/M/Nov18/E5

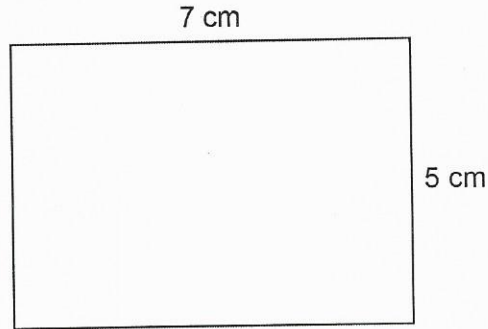
8300/2F

Do not write outside the box

Answer **all** questions in the spaces provided

1 Here is a rectangle.

Not drawn accurately



Work out the perimeter.
Circle your answer.

$$7 + 5 + 7 + 5$$

[1 mark]

12 cm

24 cm

35 cm

70 cm

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

[1 mark]

-0.901

-0.89

-0.91

$-\frac{9}{10}$



Do not write outside the box

3 Simplify $8x - 3 + 6x$
Circle your answer.

[1 mark]

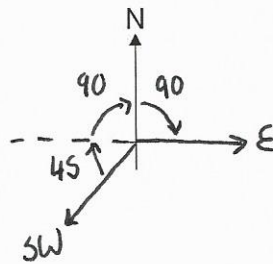
$2x - 3$

$11x$

$5 + 6x$

$14x - 3$

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

Turn over ►



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]

$$303.40 \div 37 = 8.20$$

$$8.20 + 0.25 = 8.45$$

$$8.45 \times 37 = \pounds 312.65$$

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	<u>884.79</u>
17/09/18	Gas bill		87.31	<u>797.48</u>
24/09/18	Salary	2069.75		<u>2867.23</u>

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

[1 mark]

Money that comes out of your bank account.

Turn over for the next question

Turn over ►



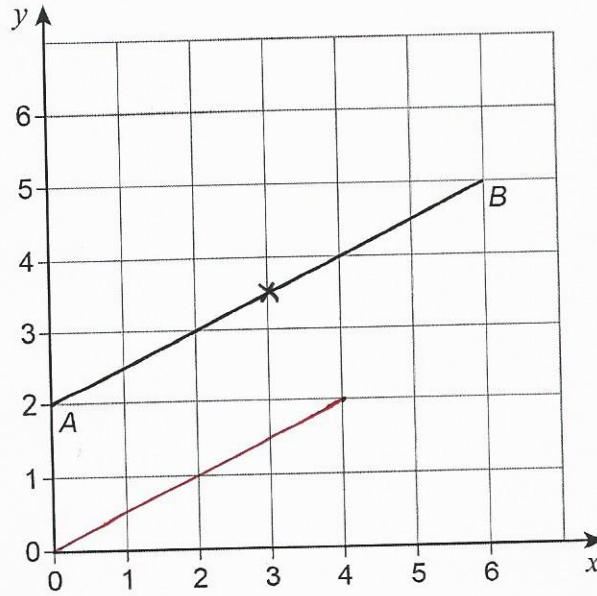
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7

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 (3 , 3.5)



- 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 (4 , 4)

- 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]

Turn over for the next question



- 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]

R	T	S	B
R	T	B	S
R	B	T	S
R	B	S	T
R	S	B	T
R	S	T	B



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]

$$13:50 + 0:15 = 14:05$$

+ 4 mins

$$14:09 + 0:13 = 14:22$$

+ 4 mins

$$14:26 + 0:35 = 15:01$$

+ 4 mins

$$15:05 + 1:30 = 16:35$$

Answer _____

5

Turn over ►

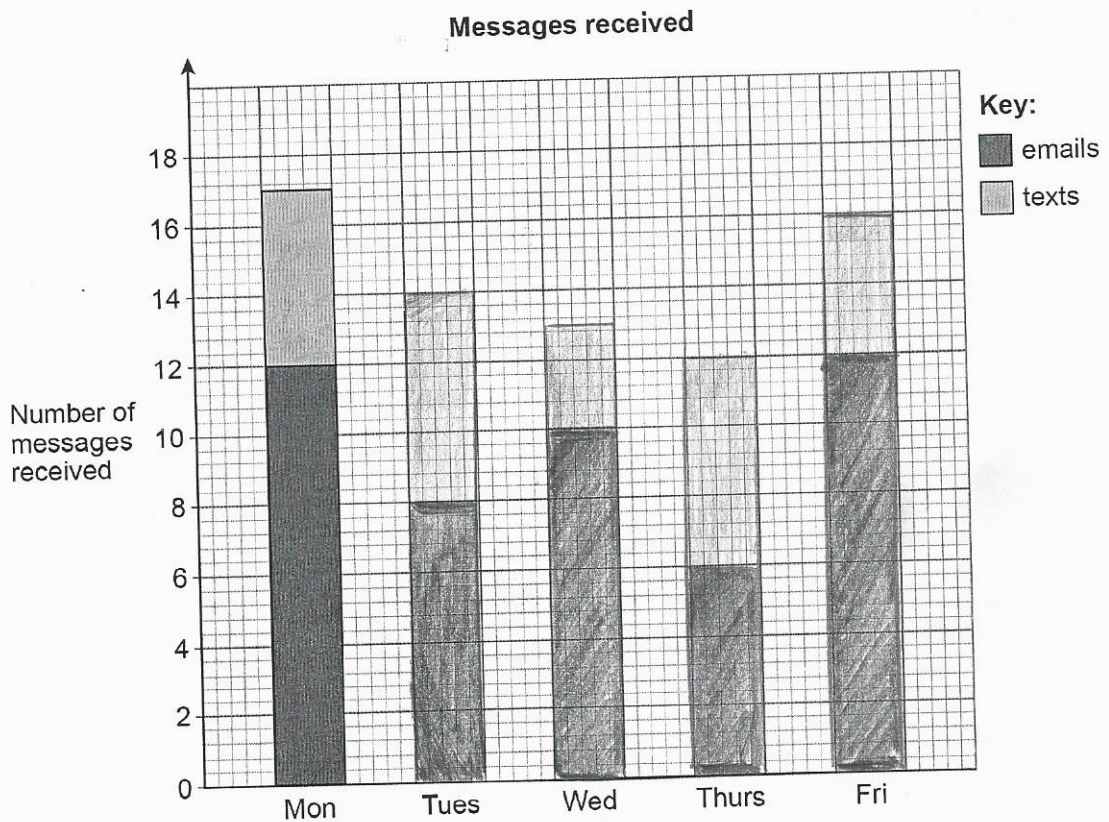


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9 The table shows the number of messages Sam received each day for five days.

	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]

Total Emails = 48

Total texts = 24

$$\frac{48}{72} = \frac{2}{3}$$

(Handwritten: 48 and 72 are both divided by 24)

Answer _____

10 Each side of a square is made 3 times as long.
What happens to the perimeter?
Circle your answer.

[1 mark]

x 3

x 6

x 9

x 12

Turn over for the next question

6

Turn over ►



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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]

$$\div 2 \quad \times 3$$

Flour	<u>180g</u>
Eggs	<u>3</u>
Milk	<u>315 ml</u>

11 (b) Convert 210 millilitres to fluid ounces.

Use 1 fluid ounce = 28.4 millilitres

Give your answer to 1 decimal place.

[2 marks]

$$\frac{210}{28.4} = 7.394$$

Answer 7.4 fluid ounces

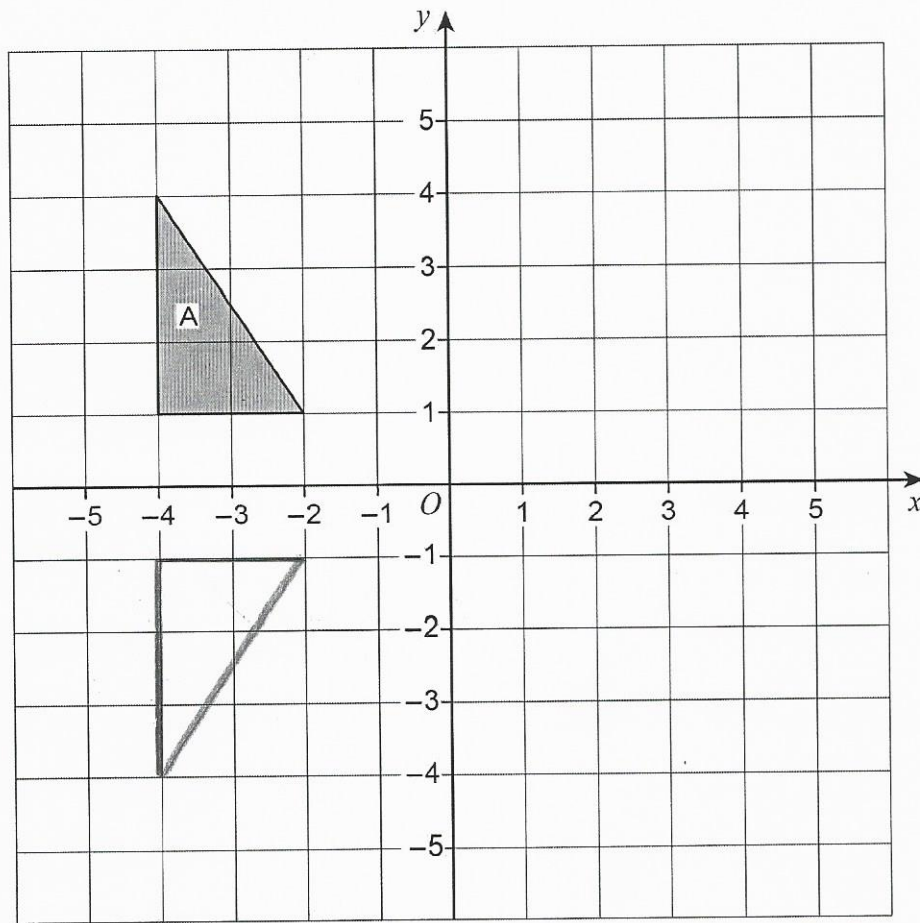


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12

Reflect shape A in the x -axis.

[2 marks]



Turn over for the next question

7

Turn over ►



- 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]

$$\frac{1}{2} \times 3000 = 1500$$

$$1500 \times 8.60 = \pounds 12900$$

$$1500 \div 3 = 500$$

$$500 \times 8.60 \times 0.25 = \pounds 1075$$

$$12900 + 1075$$

Answer £ 13 975



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]

The 25% increase will be on a greater
amount.

Turn over for the next question

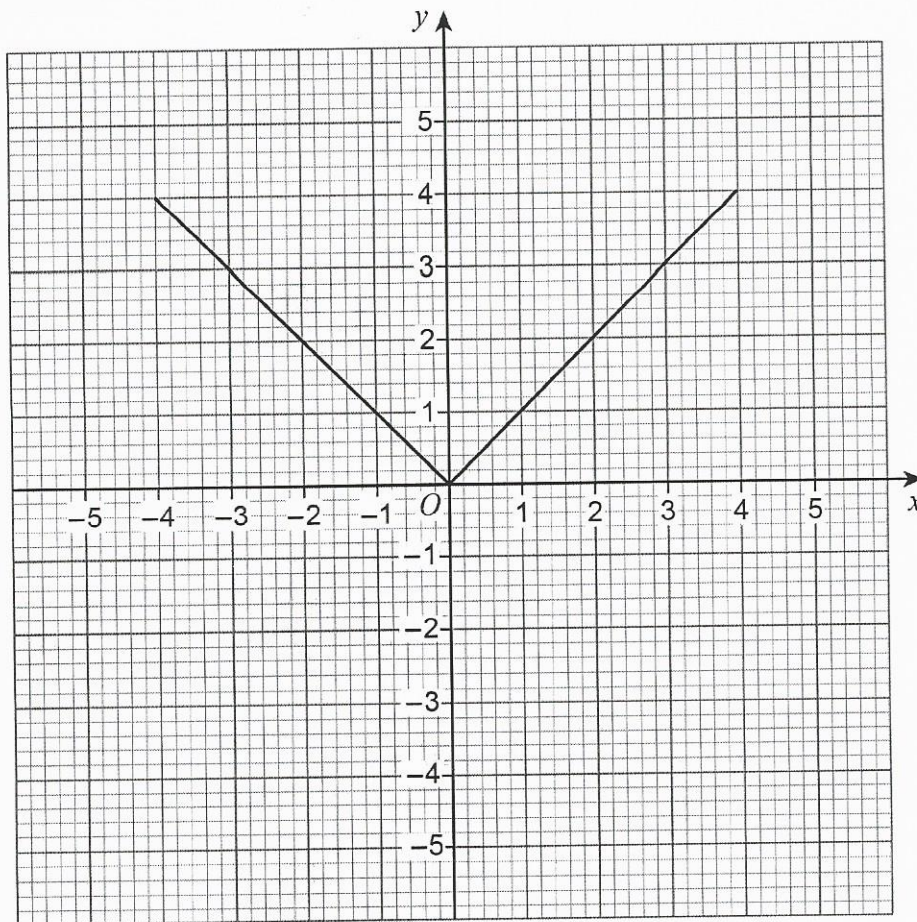
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14

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 The graph only goes from -4 to 4

Criticism 2 The graph is incorrect for $x < 0$
(The graph here is $y = -x$)



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]

$$20 = 4 + (1.8 \times 8) + b$$

$$20 = 4 + 14.4 + b$$

$$20 = 18.4 + b$$

$$-18.4 \quad -18.4$$

$$b = \text{£}1.60$$

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 $C = 3 + 1.9m$

6

Turn over ►



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16 What does $(A \cap B)$ represent in $P(A \cap B)$?
Circle your answer.

[1 mark]

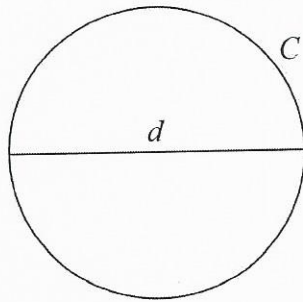
A or B or both

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 _____ π _____



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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]

$$240 \div 30 = 8$$

$$8 \times 1 = 8$$

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]

Assume 30 days per month

$$\therefore 30 \times 10 = 300$$

$$300 \times 25 \times 240 = 1800000$$

Answer _____ litres

7

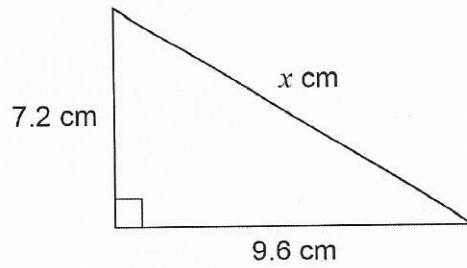
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19

Here is a right-angled triangle.

Not drawn
accuratelyShow that $x = 12$

[2 marks]

$$\begin{aligned}x^2 &= 7.2^2 + 9.6^2 \\ &= 51.84 + 92.16 \\ &= 144\end{aligned}$$

$$\begin{aligned}x &= \sqrt{144} \\ &= 12 \text{ cm}\end{aligned}$$



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]

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

$$35x + 40 + 6x + 3b \equiv ax + 13$$

$$41x + 40 + 3b \equiv ax + 13$$

$$41x = ax \quad \therefore a = 41$$

$$40 + 3b = 13$$

$$\begin{array}{r} -40 \\ -40 \end{array}$$

$$3b = -27$$

$$\begin{array}{r} \div 3 \\ \div 3 \end{array}$$

$$b = -9$$

$$a = \underline{\quad 41 \quad} \quad b = \underline{\quad -9 \quad}$$

21

The first four terms of a linear sequence are

$$3 \quad \underbrace{7}_{+4} \quad \underbrace{11}_{+4} \quad \underbrace{15}_{+4} \quad 19$$

Circle the expression for the n th term.

[1 mark]

$n + 6$

$4n + 3$

$7n + 4$

$n + 4$

$\frac{\quad}{7}$

Turn over ►



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22

Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leq t < 5$	12	2.5	30
$5 \leq t < 10$	7	7.5	52.5
$10 \leq t < 15$	1	12.5	12.5
$t \geq 15$	0		

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

[3 marks]

$$\begin{aligned}
 \text{Estimated Mean} &= \frac{30 + 52.5 + 12.5}{12 + 7 + 1} \\
 &= \frac{95}{20} \\
 &= 4.75 \text{ mins}
 \end{aligned}$$

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	mp	$mp \times f$
$0 \leq t < 2$	12	1	12
$2 \leq t < 4$	0	3	0
$4 \leq t < 6$	7	5	35
$6 \leq t < 8$	0	7	0
$8 \leq t < 10$	0	9	0
$10 \leq t < 12$	1	11	11

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

$$\bar{x}_{est} = \frac{58}{20} = 2.9$$

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

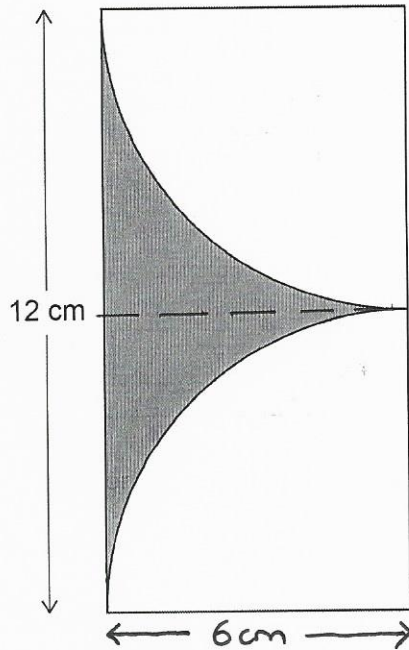
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Turn over ►



23

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



Not drawn accurately

Work out the shaded area.

[4 marks]

$$\text{Area of rectangle} = 12 \times 6 = 72 \text{ cm}^2$$

$$\text{Area of } \frac{1}{4} \text{ circle} = \frac{1}{4} \times \pi \times 6^2 = 28.274 \text{ cm}^2$$

$$\begin{aligned} \text{Area shaded} &= 72 - (28.274 + 28.274) \\ &= 15.5 \text{ cm}^2 \end{aligned}$$

Answer _____ cm²



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°

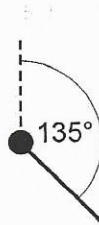
Off



Fully on



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]

$$\frac{135}{180} = \frac{3}{4}$$

$$\frac{3}{4} \text{ of } 14 = 10.5 \text{ Litres per minute}$$

$$\frac{79.8}{10.5} = 7.6 \text{ minutes}$$

\therefore No, it will take longer.

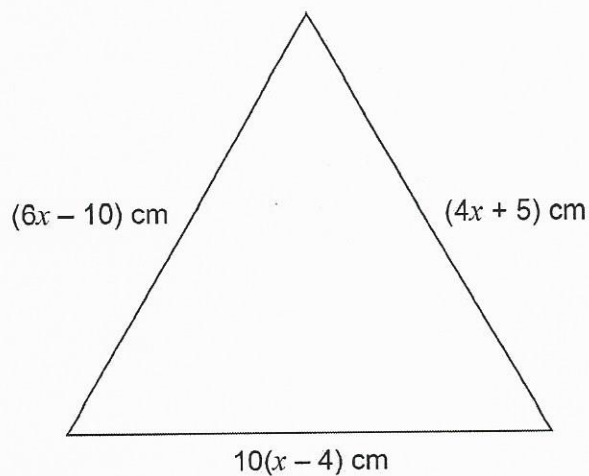
8

Turn over ►



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]

$$6x - 10 = 4x + 5$$

$$\begin{array}{r} +10 \\ \hline \end{array} \quad \begin{array}{r} +10 \\ \hline \end{array}$$

$$6x = 4x + 15$$

$$\begin{array}{r} -4x \\ \hline \end{array} \quad \begin{array}{r} -4x \\ \hline \end{array}$$

$$2x = 15$$

$$\begin{array}{r} \div 2 \\ \hline \end{array} \quad \begin{array}{r} \div 2 \\ \hline \end{array}$$

$$x = 7.5$$

$$6x - 10 = 35$$

$$4x + 5 = 35$$

$$10(x - 4) = 35$$

$$35 + 35 + 35 = 105$$

$$\therefore \text{It is longer than } 1 \text{ m}$$


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]

$$3.041839619$$

$$3.14 - 3.041839619 = 0.098 \dots$$

\therefore Within 0.1

27

Work out $\frac{9.12 \times 10^{10}}{3.2 \times 10^4}$

Give your answer in standard form.

[2 marks]

$$9.12 \div 3.2 = 2.85$$

$$10^{10} \div 10^4 = 10^{(10-4)} = 10^6$$

Answer 2.85×10^6

END OF QUESTIONS

