AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

Foundation Tier Unit 3 Geometry and Algebra

Tuesday 8 November 2016 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.
- 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 that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

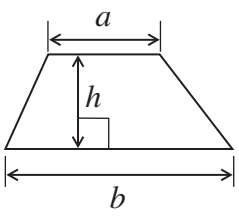
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- Quality of your written communication is specifically assessed in Questions 3, 16 and 20. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.

Advice

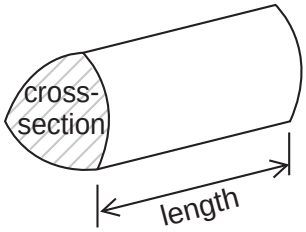
- In all calculations, show clearly how you work out your answer.

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

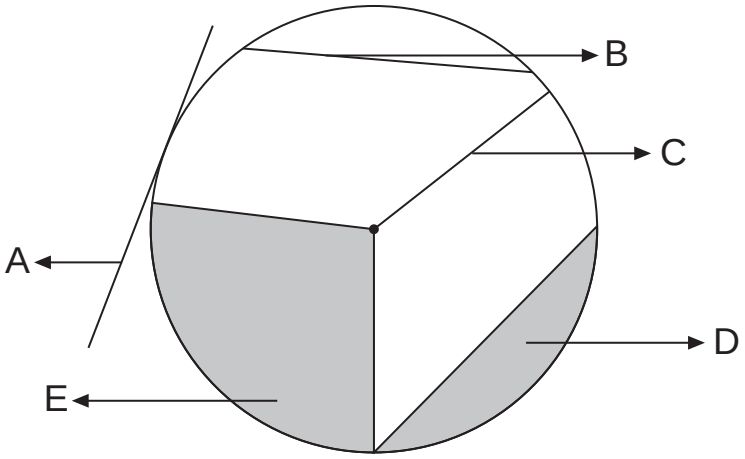


Volume of prism = area of cross section × length



Answer **all** questions in the spaces provided.

1 Parts of a circle are shown.



Circle the correct letter for each part.

1 (a) Radius

[1 mark]

A B C D E

1 (b) Sector

[1 mark]

A B C D E

1 (c) Tangent

[1 mark]

A B C D E

3

2 (a) Which **one** of these shapes always has four equal sides?
Circle your answer.

[1 mark]

Kite Parallelogram Rectangle Rhombus Trapezium

2 (b) Which **one** of these shapes has exactly one pair of parallel sides?
Circle your answer.

[1 mark]

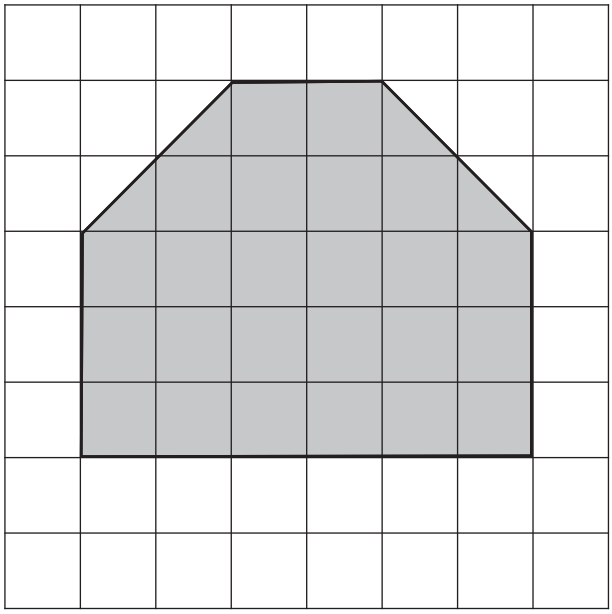
Kite Parallelogram Rectangle Rhombus Trapezium

2 (c) Which **two** of these shapes always have diagonals intersecting at right angles?
Circle your answers.

[2 marks]

Kite Parallelogram Rectangle Rhombus Trapezium

***3** A sketch of a patio is shaded on this grid.



Each square represents 1 metre by 1 metre.

Beth uses this formula to work out the cost of building the patio.

Cost (£) = area of patio in square metres × 13.60

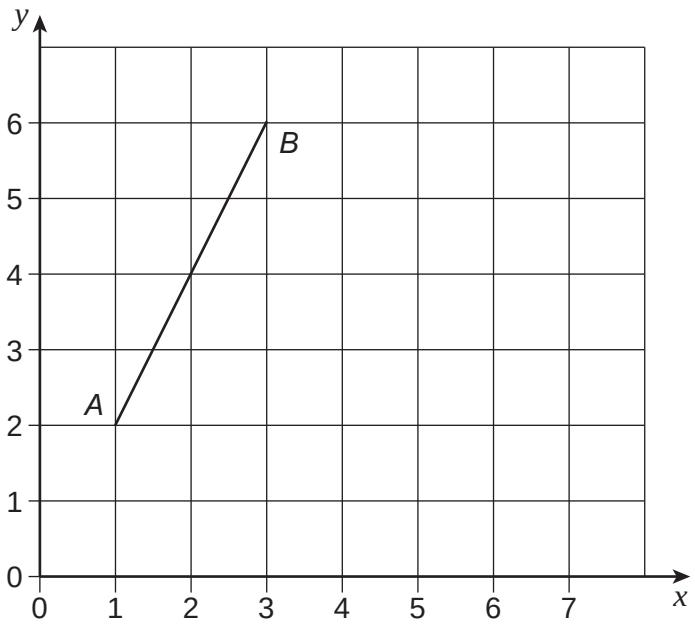
Work out the cost of building the patio.

[3 marks]

Answer £ _____

7

4 Here is a centimetre grid.



4 (a) Measure and write down the length of *AB*.

[1 mark]

Answer _____ cm

4 (b) Write down the coordinates of the midpoint of *AB*.

[1 mark]

Answer (_____ , _____)

4 (c) *C* is a point on the grid.

ABC is an isosceles triangle.
AB = *AC*

Circle the coordinates of the **two** possible positions of *C*.

[2 marks]

(4, 0) (5, 0) (6, 0) (5, 3) (5, 4) (5, 5)

4 (d) *D* is a point on the grid.

ABD is an isosceles triangle.
AB = *BD*

Circle the coordinates of the **two** possible positions of *D*.

[2 marks]

(4, 2) (5, 2) (6, 2) (7, 3) (7, 4) (7, 5)

Turn over for the next question

6

5 (a) Convert 0.17 kilometres to metres.

[1 mark]

Answer _____ metres

5 (b) Convert 1800 millimetres to metres.

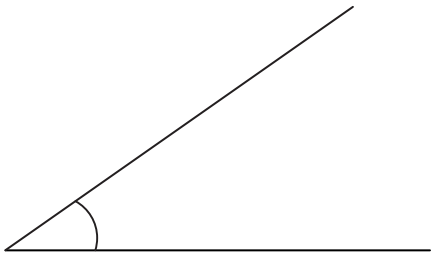
[1 mark]

Answer _____ metres

Do not write outside the box

6 (a) Measure the size of the marked angle.

[1 mark]



Answer _____ degrees

6 (b) What type of angle is 290°?
Circle your answer.

[1 mark]

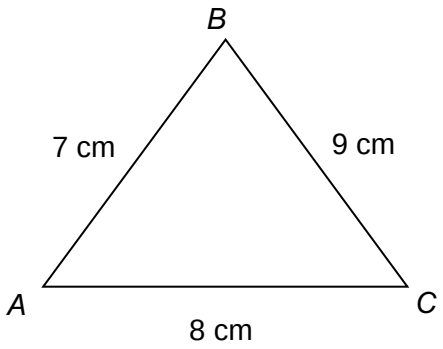
Acute Right-angle Obtuse Reflex

Turn over for the next question

4

7 Using a ruler and compasses, make an accurate drawing of this triangle.
AC has been drawn for you.

[2 marks]



Not drawn accurately

8 A box of 4 bottles of water costs £1.12
A box of 6 bottles of water costs £1.75

Which box is better value for money?
You **must** show your working.

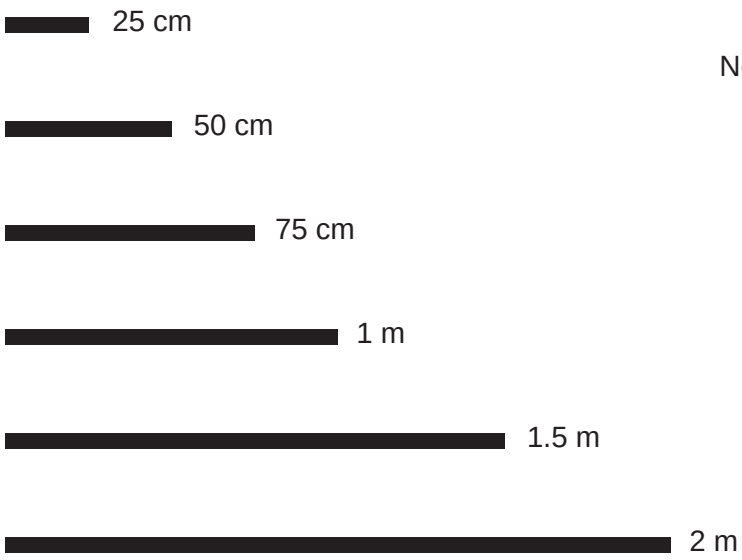
[2 marks]

Answer _____

Turn over for the next question

4

9 Here are six sticks.



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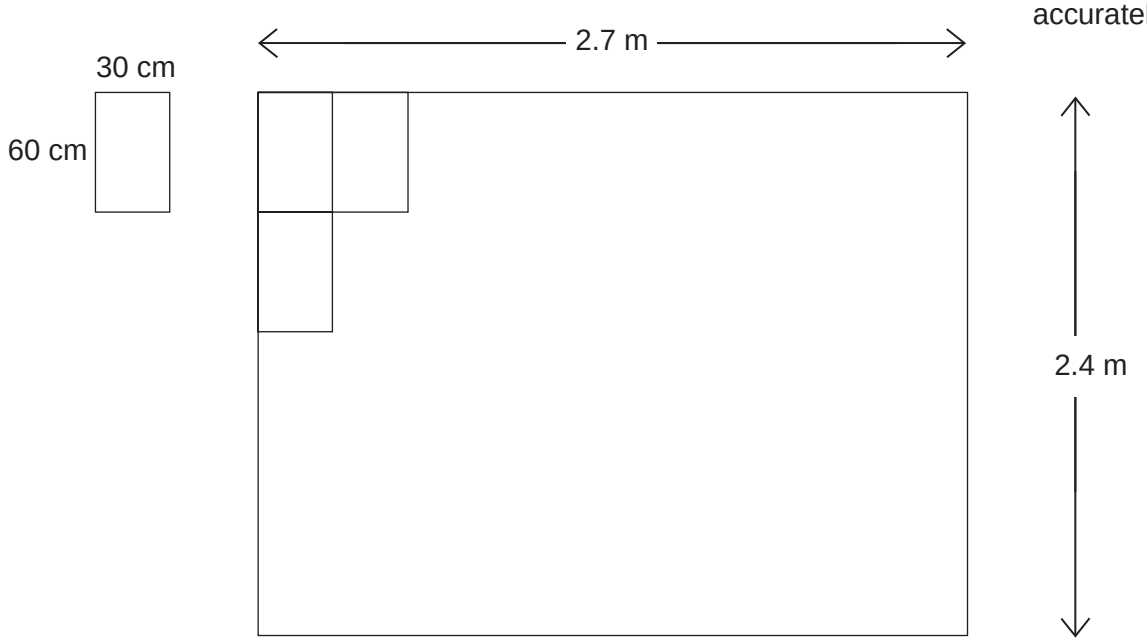
Show how **all** six sticks can fit together to make a rectangle.

[2 marks]

10 A rectangular tile and a rectangular wall are shown.

Not drawn accurately



How many tiles are needed to cover the wall?

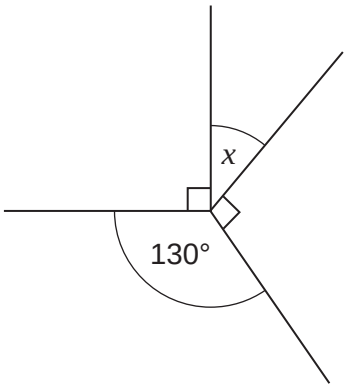
[3 marks]

Answer _____

5

Turn over ▶

11 (a) Work out the size of angle x.

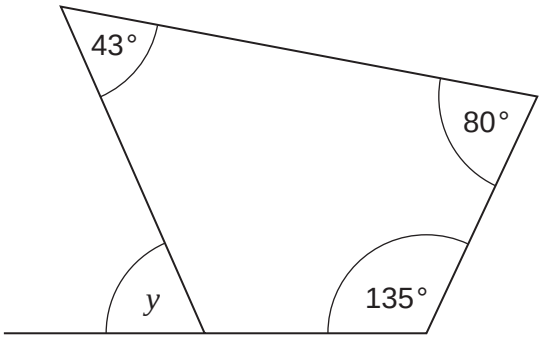


Not drawn accurately

[2 marks]

Answer _____ degrees

11 (b) The base line of this quadrilateral is extended.



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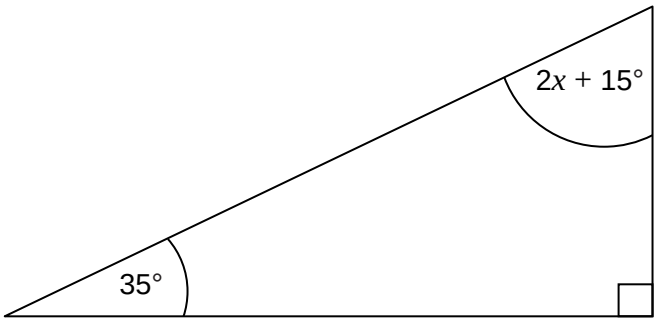
Work out the size of angle y.

[3 marks]

Answer _____ degrees

12



Not drawn accurately

Work out the value of x.

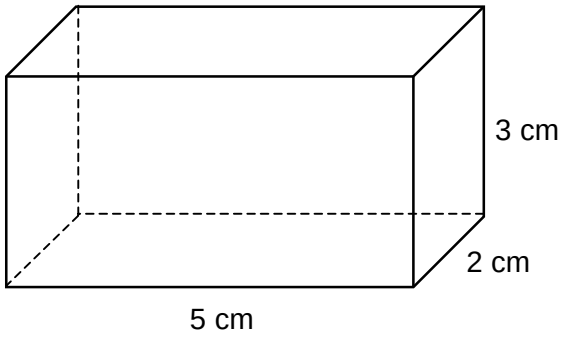
[3 marks]

Answer _____ degrees

Turn over for the next question

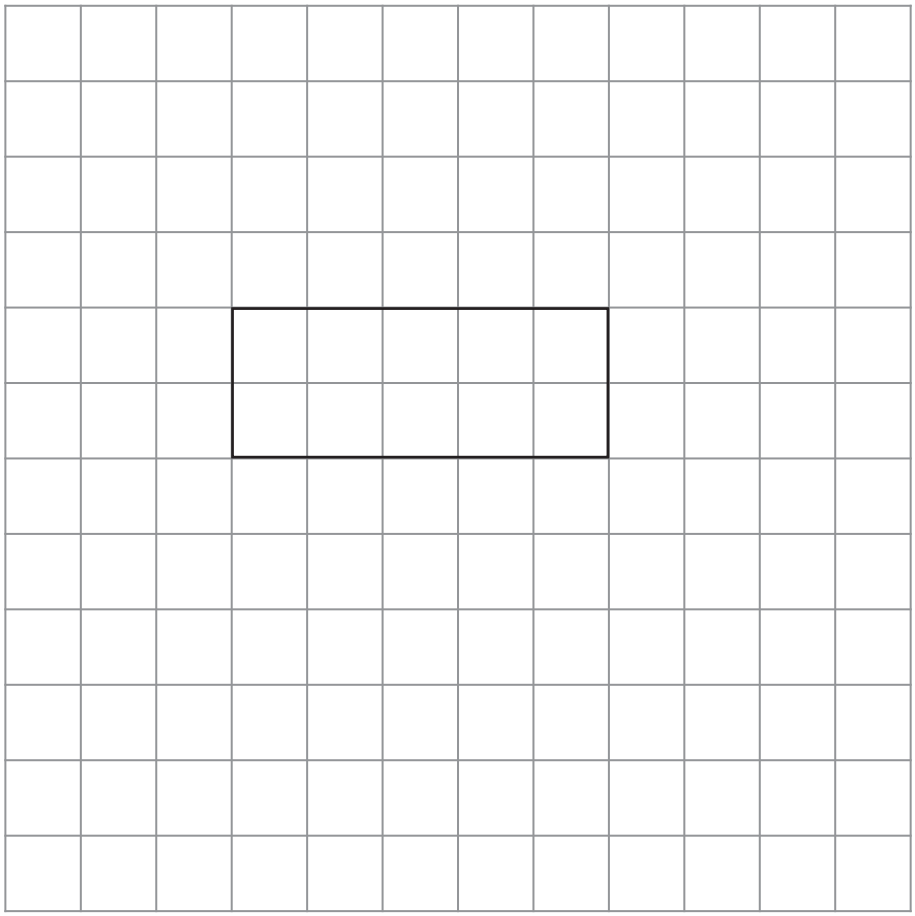
8

13 (a) The diagram shows a cuboid.



Draw an accurate net of the cuboid on this centimetre grid.
One face has been done for you.

[2 marks]



13 (b) Each edge of the cuboid is enlarged by scale factor 4

Write down the dimensions of the enlarged cuboid.

[1 mark]

Answer _____ cm, _____ cm, _____ cm

13 (c) Work out the volume of the enlarged cuboid.

[1 mark]

Answer _____ cm^3

Turn over for the next question

4

14 John goes on this walk.

From	To	Direction (bearing)	Distance
A	B	East	1 mile
B	C	160°	2 miles
C	D	South-west	1 mile
D	A		

14 (a) Make an accurate scale drawing of the walk.
Use a scale of 2 cm to represent 1 mile.

[4 marks]

Scale 2 cm represents 1 mile

14 (b) Work out the distance from D to A.
Give your answer to the nearest mile.

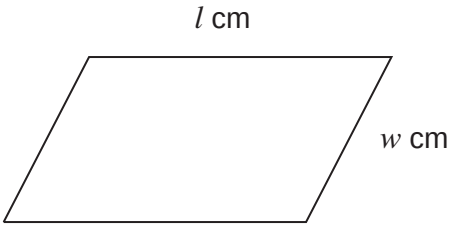
[1 mark]

Answer _____ miles

Turn over for the next question

5

15 (a)



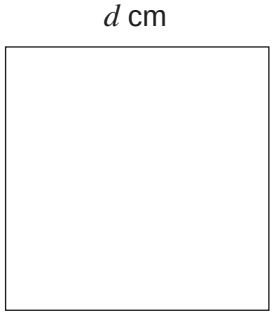
The perimeter of the parallelogram is P cm

Circle the correct formula.

[1 mark]

$P = l + w$ $P = lw$ $P = 2(l + w)$ $P = 2lw$

15 (b)



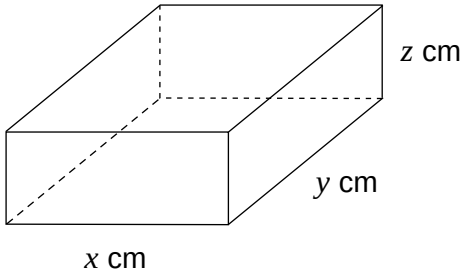
The area of the square is A cm^2

Circle the correct formula.

[1 mark]

$A = 2d$ $A = 4d$ $A = \sqrt{d}$ $A = d^2$

15 (c)



The surface area of the cuboid is S cm^2

Circle the correct formula.

[1 mark]

$S = xyz$ $S = (xyz)^2$ $S = 6xyz$ $S = 2(xy + xz + yz)$

15 (d) The surface area of a **cube** is 150 cm^2

Work out the volume of the cube.

[4 marks]

Answer _____ cm^3

7

***16** The same type of shirt is sold in two shops.

Shop A

£19.90

Buy one
get second for half price

Shop B

£18

Get a 15% discount
when you buy two

Which shop is cheaper for buying **two** of these shirts?
You **must** show your working.

[5 marks]

Answer _____

17 Jacques travels 240 km in 2 hours 30 minutes.

Work out his average speed.
State the units of your answer.

[3 marks]

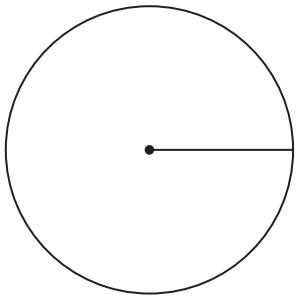
Answer _____

Turn over for the next question

8

18 (a) The radius of this circle is 2.5 cm

Not drawn accurately



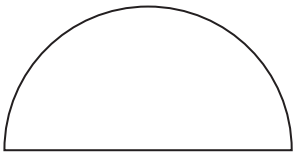
Work out the area.
Give your answer to 1 significant figure.

[3 marks]

Answer _____ cm^2

18 (b) The diameter of this semicircle is 16 cm

Not drawn accurately



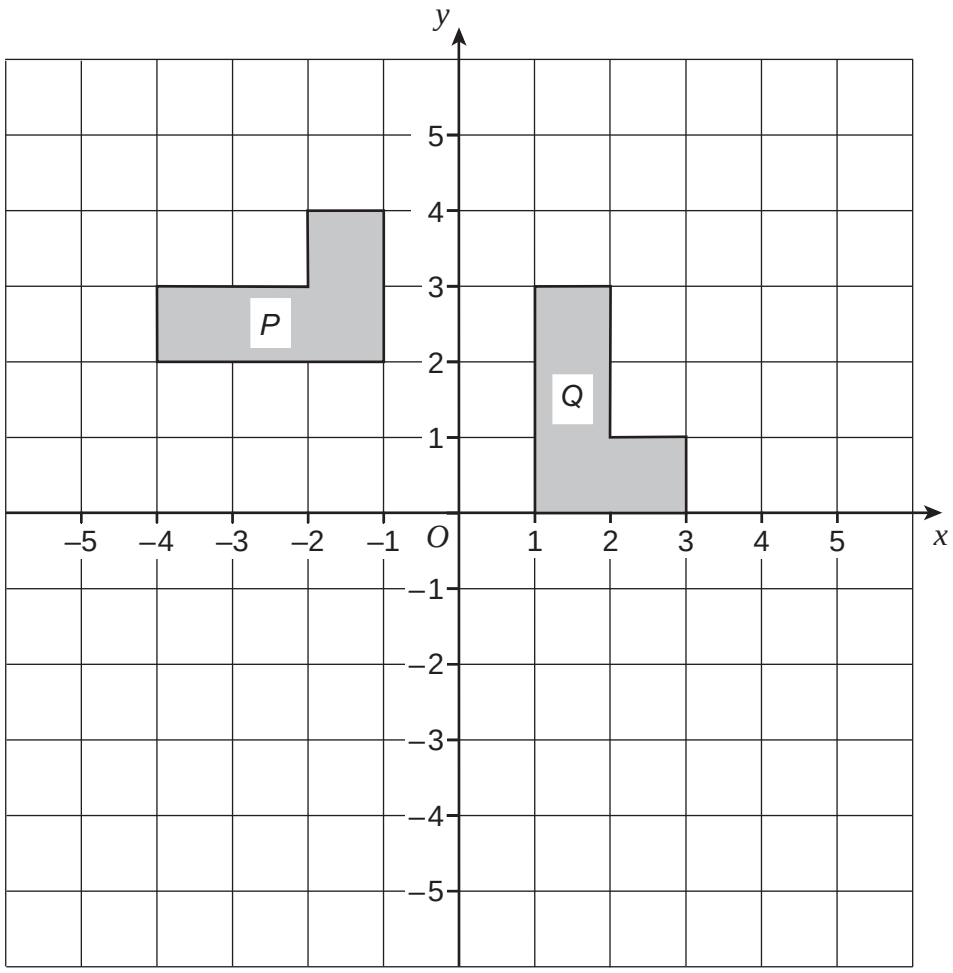
Work out the perimeter of the semicircle.

[3 marks]

Answer _____ cm

19 (a) Describe fully the **single** transformation that maps shape *P* to shape *Q*.

[3 marks]



19 (b) On the grid, translate shape *Q* by vector $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$

[2 marks]

11

***20** Use trial and improvement to find a positive solution to $x^3 - 10x = 6$
Give your answer to 1 decimal place.

[4 marks]

x	$x^3 - 10x$	**Comment**
4	24	Too big

$x =$ _____

21 Ali is going to drive 210 miles.

He has 27 **litres** of petrol in his car.
His car travels 36 miles for each **gallon** of petrol.

Does he have enough petrol for the journey?
You **must** show your working.

[4 marks]

Answer _____

END OF QUESTIONS

8

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED