

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE MATHEMATICS

# F

Foundation Tier Unit 3 Geometry and Algebra

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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  $\pi$  button, take the value of  $\pi$  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.

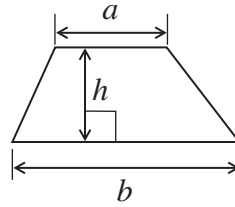
## Advice

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

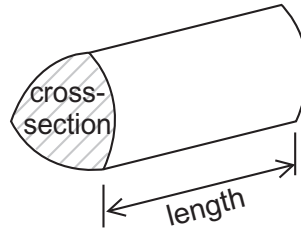


**Formulae Sheet: Foundation Tier**

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

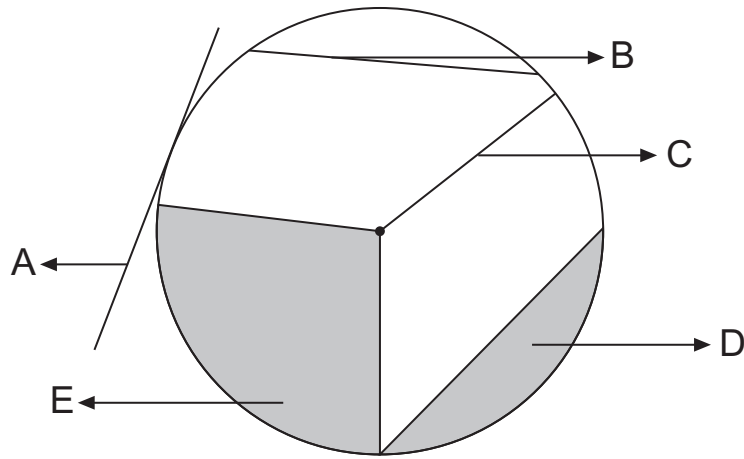


**Volume of prism** = area of cross section  $\times$  length



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



- 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.

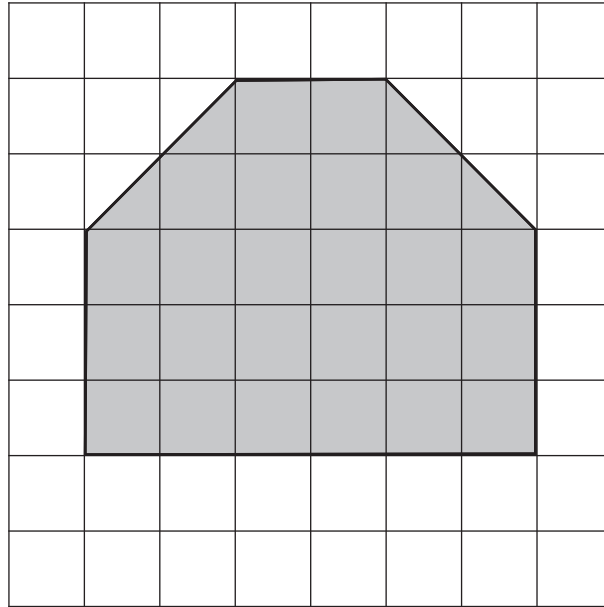
[2 marks]

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.

$$\text{Cost (£)} = \text{area of patio in square metres} \times 13.60$$

Work out the cost of building the patio.

**[3 marks]**


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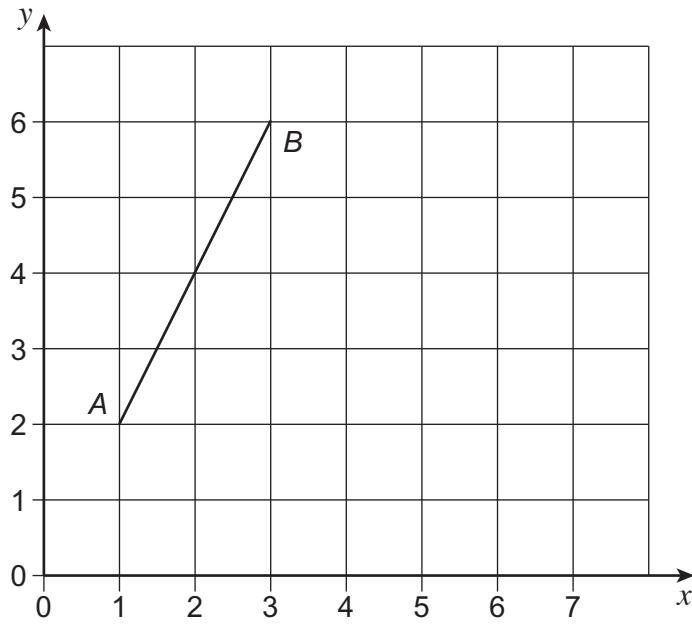


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Answer £ \_\_\_\_\_



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**



**5 (a)** Convert 0.17 kilometres to metres.

**[1 mark]**

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Answer \_\_\_\_\_ metres

**5 (b)** Convert 1800 millimetres to metres.

**[1 mark]**

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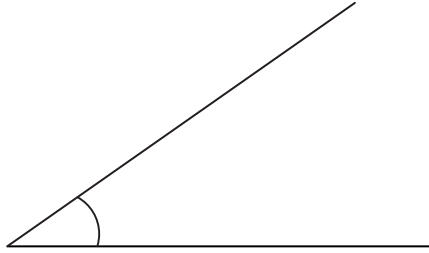
Answer \_\_\_\_\_ metres





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

[1 mark]



Answer \_\_\_\_\_ degrees

6 (b) What type of angle is  $290^\circ$ ?  
Circle your answer.

[1 mark]

Acute

Right-angle

Obtuse

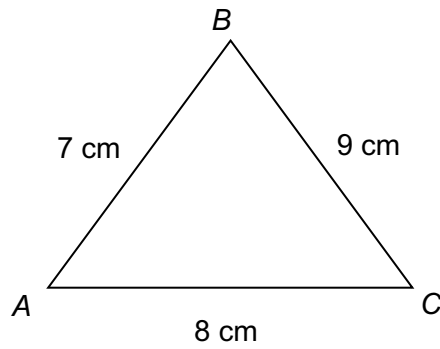
Reflex

Turn over for the next question



- 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]

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Answer \_\_\_\_\_

Turn over for the next question



9 Here are six sticks.

 25 cm

Not drawn accurately

 50 cm

 75 cm

 1 m

 1.5 m

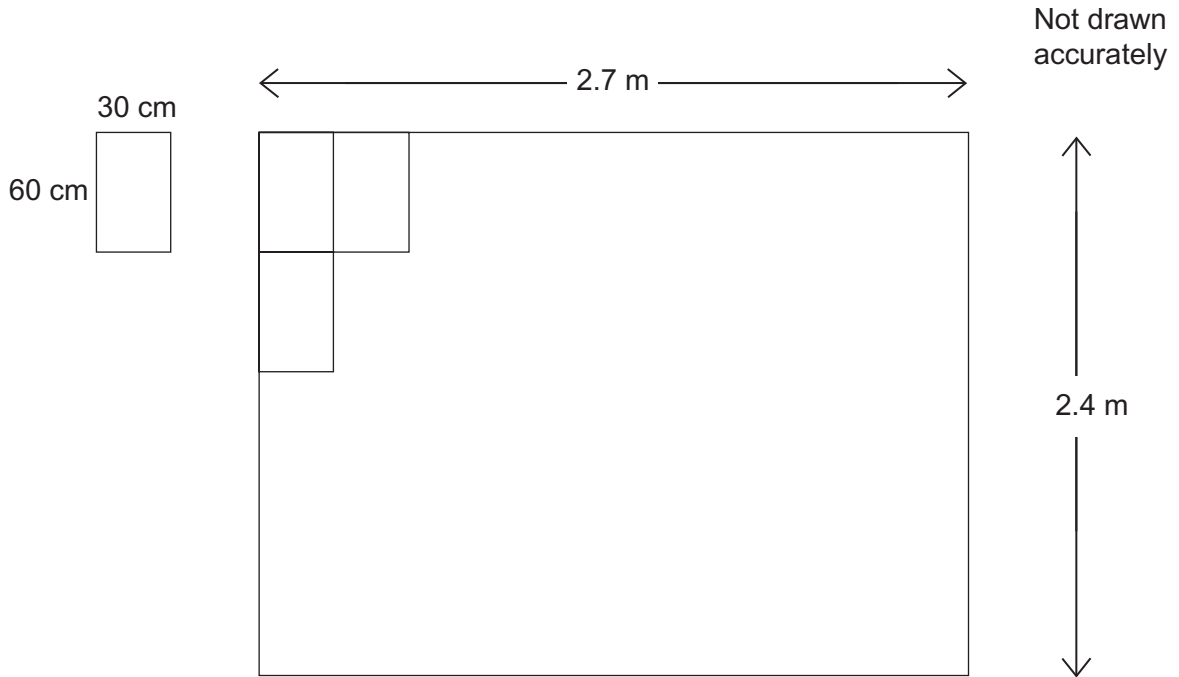
 2 m

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

**[2 marks]**



10 A rectangular tile and a rectangular wall are shown.



How many tiles are needed to cover the wall?

[3 marks]

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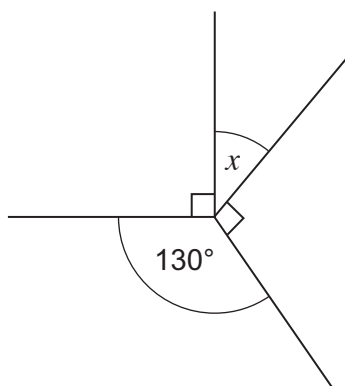
Answer \_\_\_\_\_

5

Turn over ►



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



Not drawn  
accurately

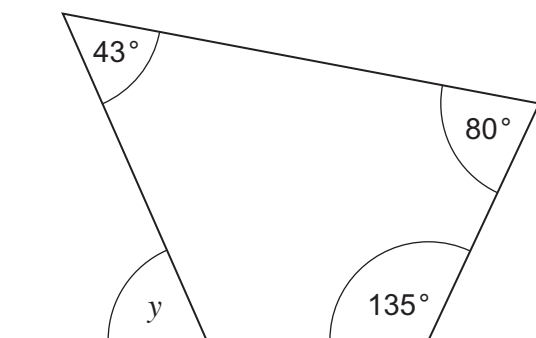
[2 marks]

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Answer \_\_\_\_\_ degrees

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



Not drawn  
accurately

Work out the size of angle  $y$ .

[3 marks]

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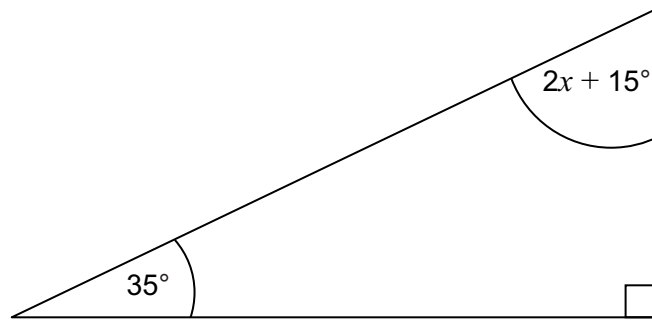
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Answer \_\_\_\_\_ degrees



12

Not drawn  
accuratelyWork out the value of  $x$ .**[3 marks]**

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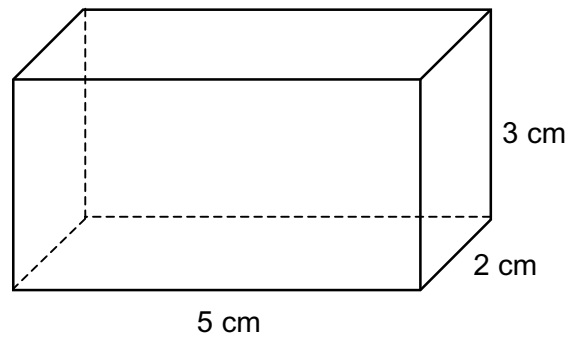
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Answer \_\_\_\_\_ degrees

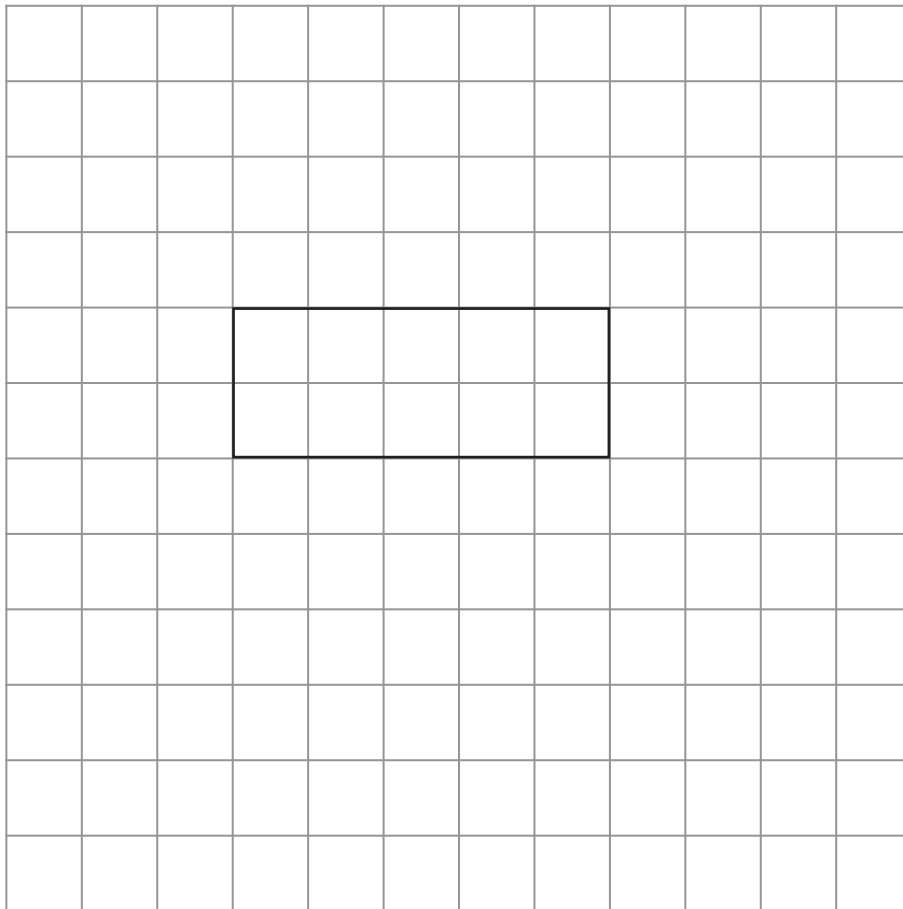
**Turn over for the next question**

- 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]

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Answer \_\_\_\_\_ cm, \_\_\_\_\_ cm, \_\_\_\_\_ cm

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

[1 mark]

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Answer \_\_\_\_\_  $\text{cm}^3$

**Turn over for the next question**



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]

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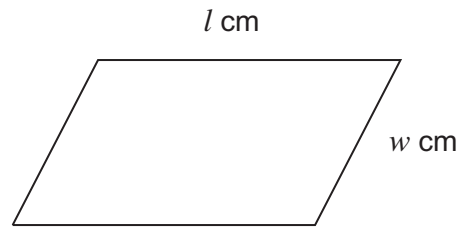
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Answer \_\_\_\_\_ miles

**Turn over for the next question**



15 (a)



The perimeter of the parallelogram is  $P \text{ cm}$

Circle the correct formula.

[1 mark]

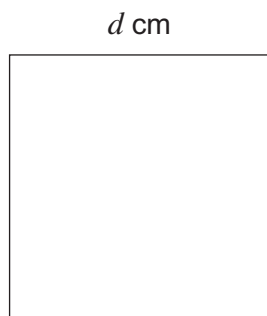
$P = l + w$

$P = lw$

$P = 2(l + w)$

$P = 2lw$

15 (b)



The area of the square is  $A \text{ cm}^2$

Circle the correct formula.

[1 mark]

$A = 2d$

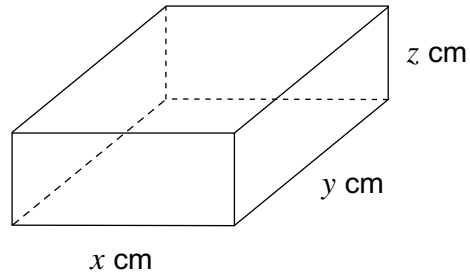
$A = 4d$

$A = \sqrt{d}$

$A = d^2$



15 (c)



The surface area of the cuboid is  $S \text{ cm}^2$

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  $150 \text{ cm}^2$

Work out the volume of the cube.

[4 marks]

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Answer \_\_\_\_\_  $\text{cm}^3$



**\*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]**

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Answer \_\_\_\_\_



17 Jacques travels 240 km in 2 hours 30 minutes.

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

[3 marks]

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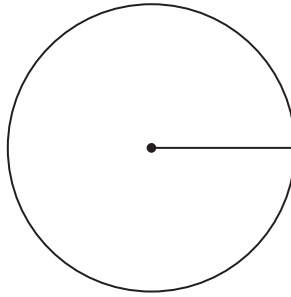
Answer \_\_\_\_\_

Turn over for the next question



- 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]**

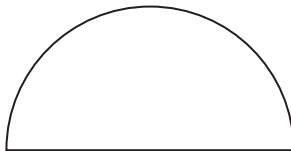
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Answer \_\_\_\_\_ cm<sup>2</sup>

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

Not drawn accurately



Work out the perimeter of the semicircle.

**[3 marks]**

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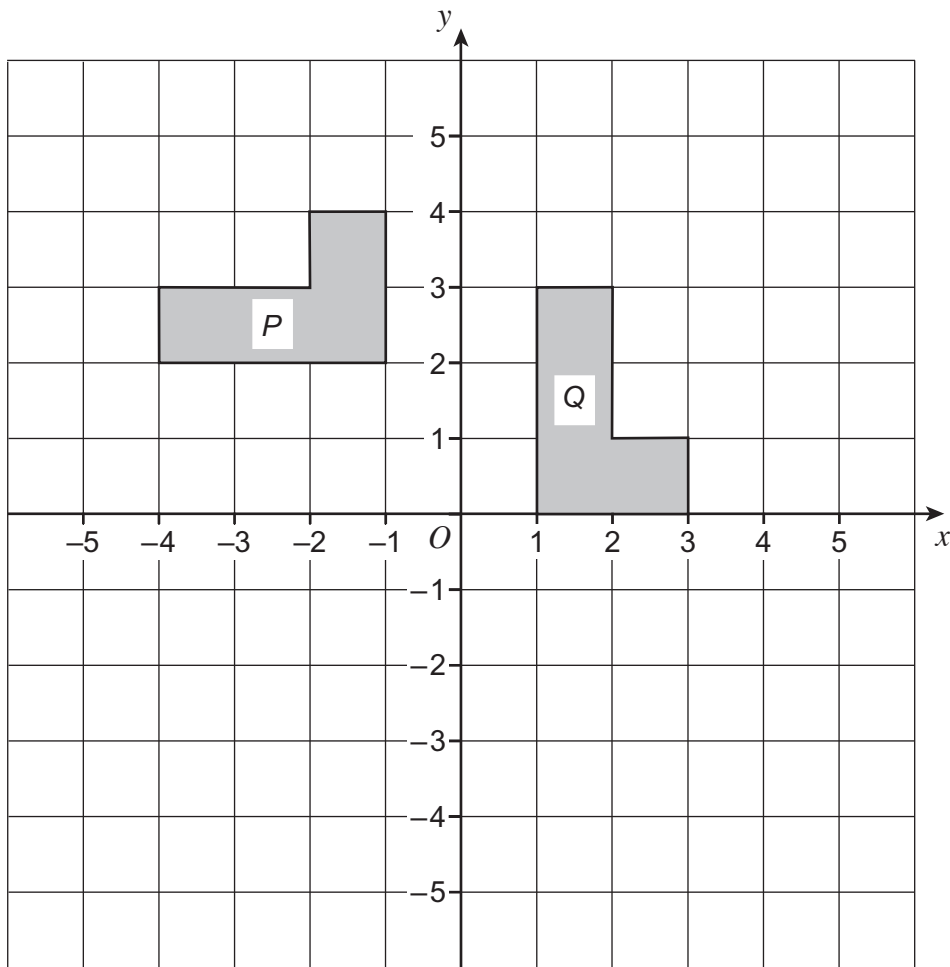
Answer \_\_\_\_\_ cm





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

[3 marks]




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

[2 marks]





**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]**

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Answer \_\_\_\_\_

**END OF QUESTIONS**

8
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