

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 14 June 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.
- 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 15 and 18. 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 book.

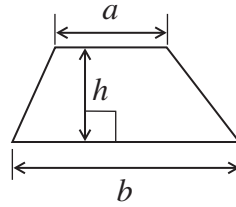
## Advice

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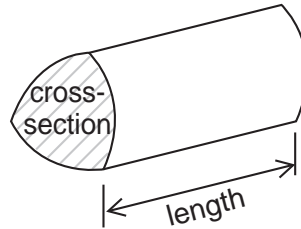


**Formulae Sheet: Foundation Tier**

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

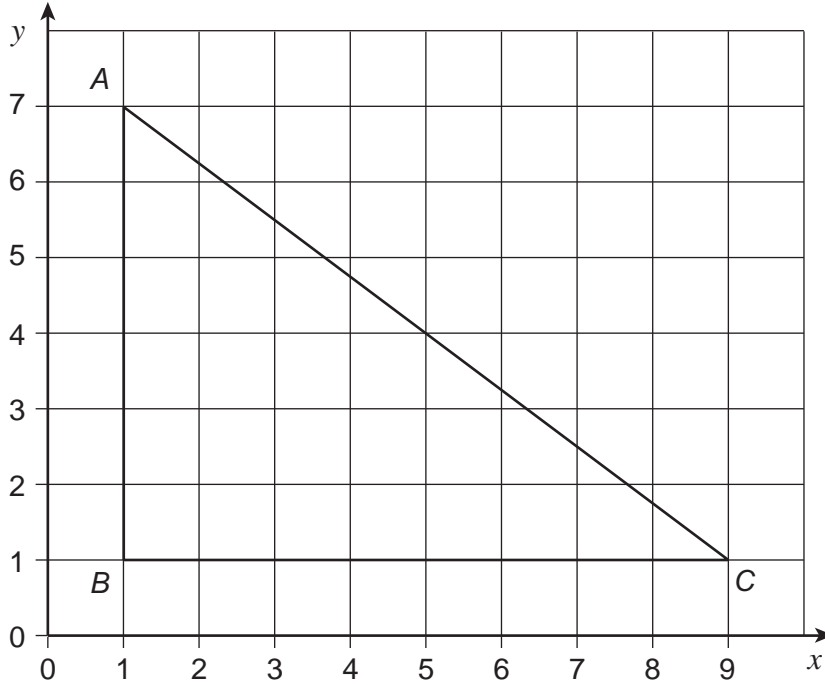


**Volume of prism** = area of cross-section  $\times$  length



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

**1** Triangle *ABC* is shown on this centimetre grid.



**1 (a)** Measure the length of the side *AC*.  
Give your answer in centimetres.

**[1 mark]**

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

**1 (b)** Work out the perimeter of the triangle.

**[2 marks]**

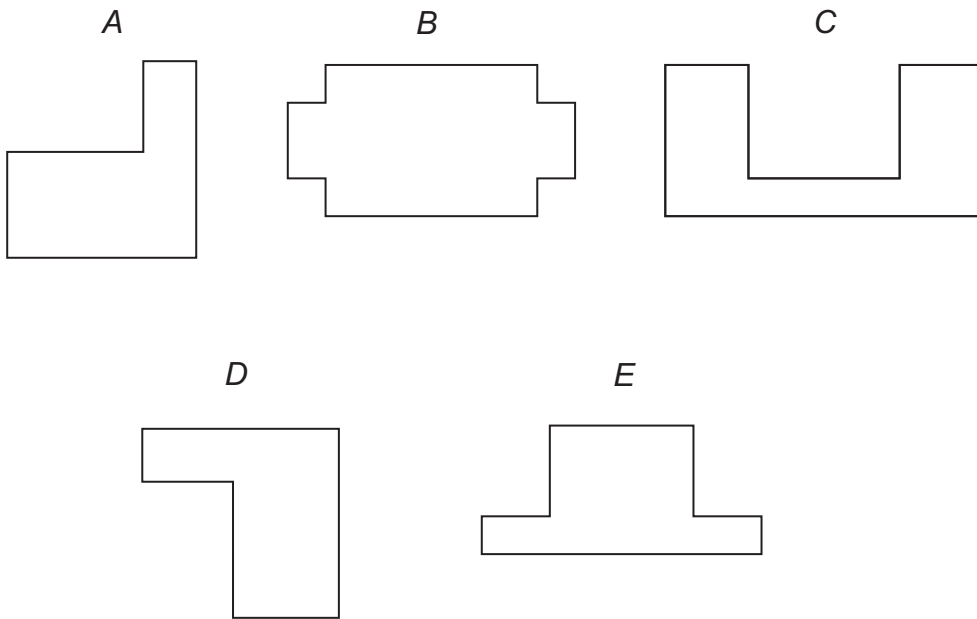
\_\_\_\_\_

\_\_\_\_\_

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



2 Here are five shapes.



2 (a) Which shape has the most vertices?  
Circle your answer.

[1 mark]

A                      B                      C                      D                      E

2 (b) Which **two** shapes are octagons?  
Circle your answers.

[1 mark]

A                      B                      C                      D                      E

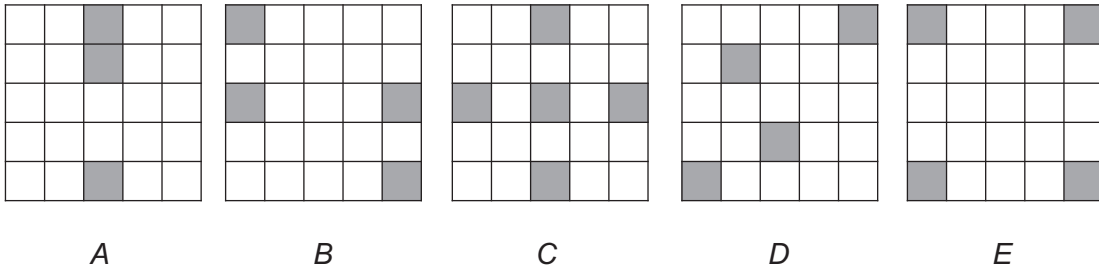
2 (c) Which **two** shapes are congruent?  
Circle your answers.

[1 mark]

A                      B                      C                      D                      E



3 A, B, C, D and E are square grids.  
Some squares have been shaded in each grid.



3 (a) Which **two** grids have four lines of symmetry?

[2 marks]

Answer \_\_\_\_\_ and \_\_\_\_\_

3 (b) Which **three** grids have rotational symmetry?

[2 marks]

Answer \_\_\_\_\_ and \_\_\_\_\_ and \_\_\_\_\_

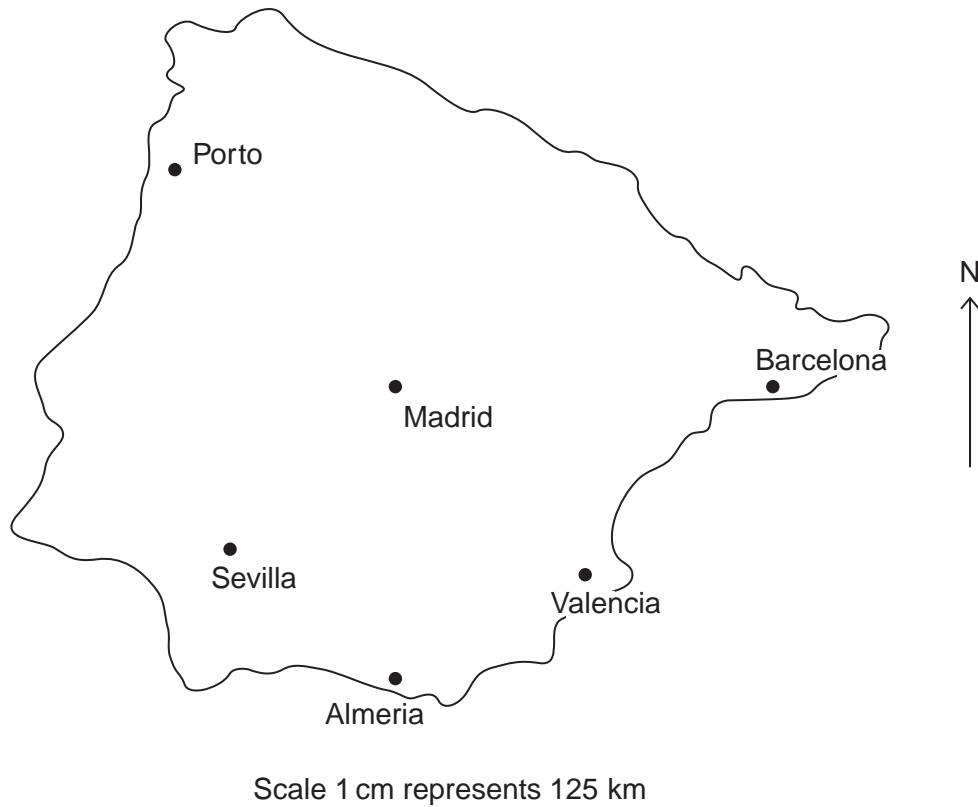
3 (c) Which grid has line symmetry but **not** rotational symmetry?

[1 mark]

Answer \_\_\_\_\_



4 Here is a map.



4 (a) Which city on the map is South-West of Madrid?  
Circle your answer.

[1 mark]

Porto

Sevilla

Almeria

Valencia

Barcelona



- 4 (b)** Which city on the map is North-East of Valencia?  
Circle your answer.

[1 mark]

Porto      Sevilla      Almeria      Madrid      Barcelona

- 4 (c)** The scale of the map is 1 cm represents 125 km  
Work out the actual distance between Barcelona and Madrid.

[3 marks]

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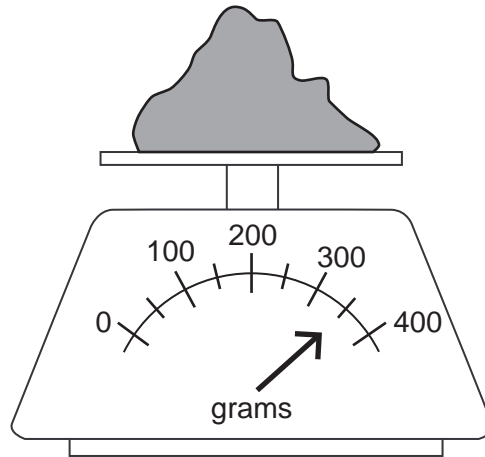
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Answer \_\_\_\_\_ km

**Turn over for the next question**



- 5 The diagram shows some flour on weighing scales.



- 5 (a) How much does the flour weigh?

[1 mark]

Answer \_\_\_\_\_ grams

- 5 (b) Gino needs 0.6 kilograms of flour.  
The scales can weigh up to 400 grams.

How can he use the scales to weigh 0.6 kilograms of flour?

[2 marks]

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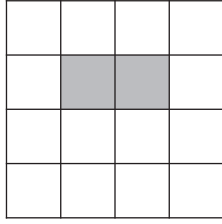
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6 (a) What fraction of this square grid is shaded?



Circle the **two** correct answers.

[2 marks]

$\frac{1}{7}$

$\frac{1}{8}$

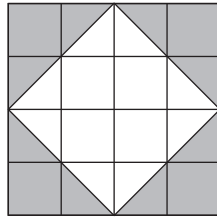
$\frac{2}{14}$

$\frac{2}{16}$

$\frac{7}{8}$

$\frac{14}{16}$

6 (b) The diagram shows a square grid.



What percentage of this grid is shaded?

[2 marks]

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Answer \_\_\_\_\_ %



7 Paint is sold in 5-litre tins and 10-litre tins.



£26.00



£45.50

7 (a) A decorator buys four 10-litre tins.

How many 5-litre tins could she buy for the same amount?  
You **must** show your working.

[3 marks]

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Answer \_\_\_\_\_



**7 (b)** Dan buys five tins of paint for £169

How many tins of each size does he buy?

**[2 marks]**

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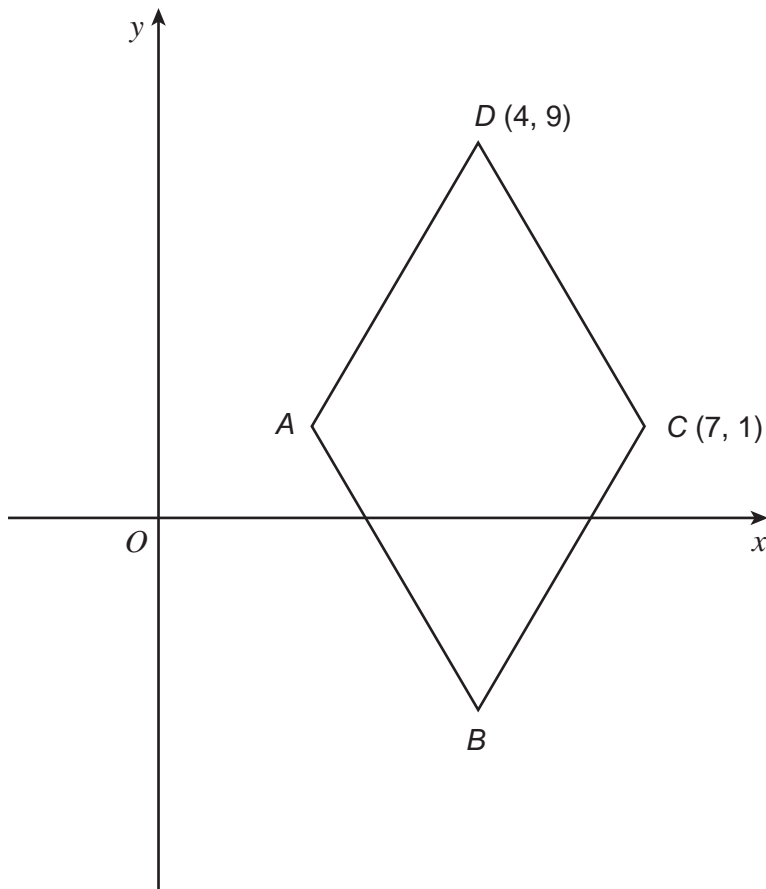
Answer \_\_\_\_\_ 5-litre tins

and \_\_\_\_\_ 10-litre tins

**Turn over for the next question**



- 8  $ABCD$  is a rhombus.  
 $AC$  is parallel to the  $x$ -axis.



Not drawn accurately

- 8 (a) Work out the coordinates of  $A$ .

[2 marks]

Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

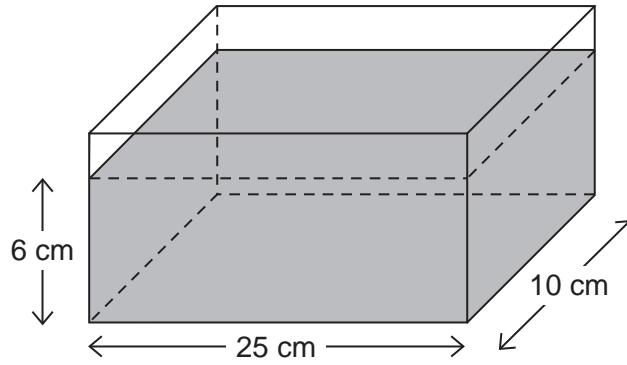
- 8 (b) Work out the coordinates of  $B$ .

[2 marks]

Answer ( \_\_\_\_\_ , \_\_\_\_\_ )



- 9 The diagram shows a water tank in the shape of a cuboid.



The height of the water in the tank is 6 cm  
Water leaks from the bottom of the tank at the rate of  $30 \text{ cm}^3$  per minute.

How many minutes will it take the tank to empty?

**[3 marks]**

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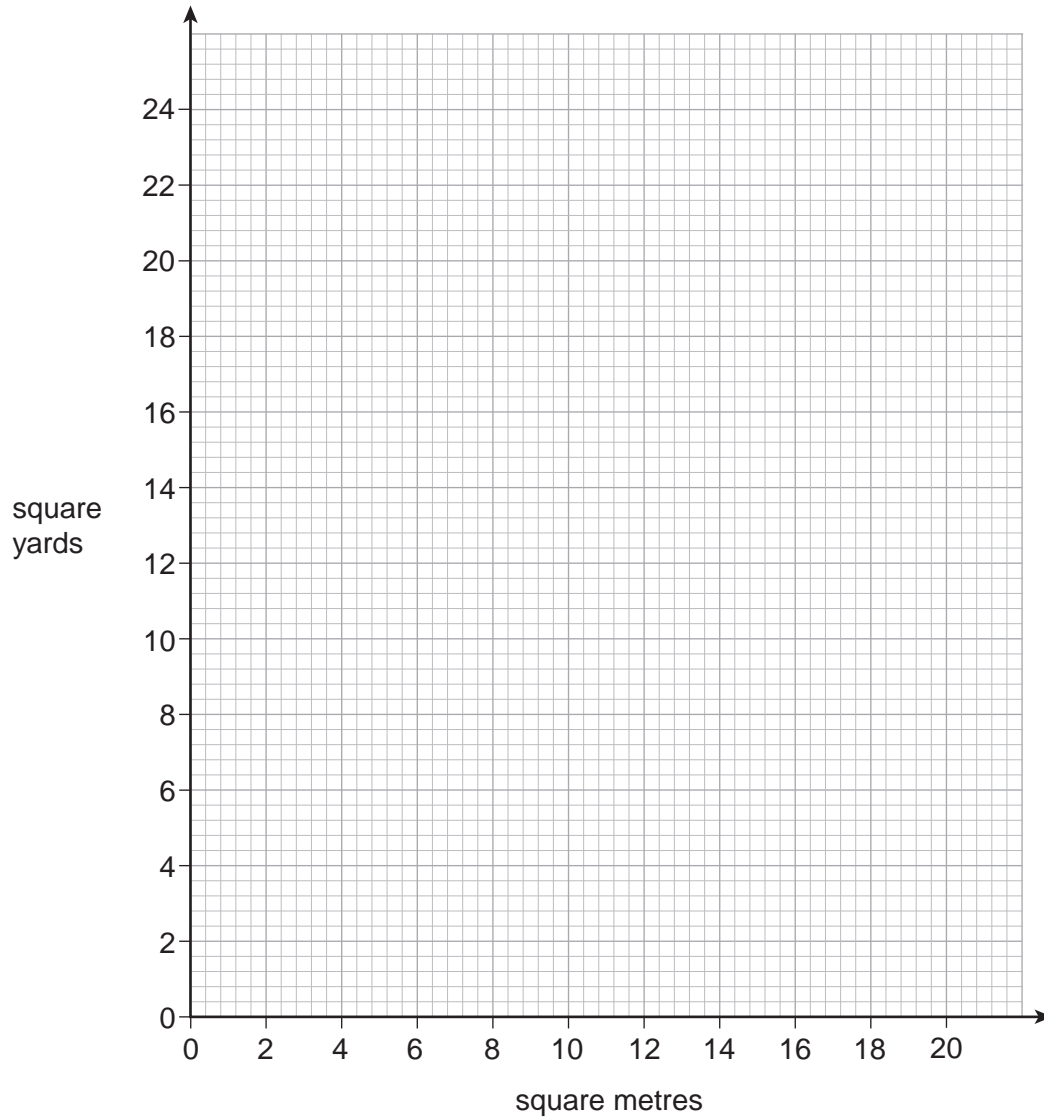
Answer \_\_\_\_\_ minutes



**10** 10 square metres = 12 square yards

**10 (a)** Draw a conversion graph between square metres and square yards.

**[2 marks]**



**10 (b)** How many square metres are equal to 18 square yards?  
Circle your answer.

**[1 mark]**

15

16

21

22



**10 (c)** The value of a piece of land is worked out using the formula

$$V = 25A$$

$V$  is the value in £

$A$  is the area of the land in square **yards**.

The area of a piece of land is 400 square **metres**.

Work out the value of the piece of land.

**[3 marks]**

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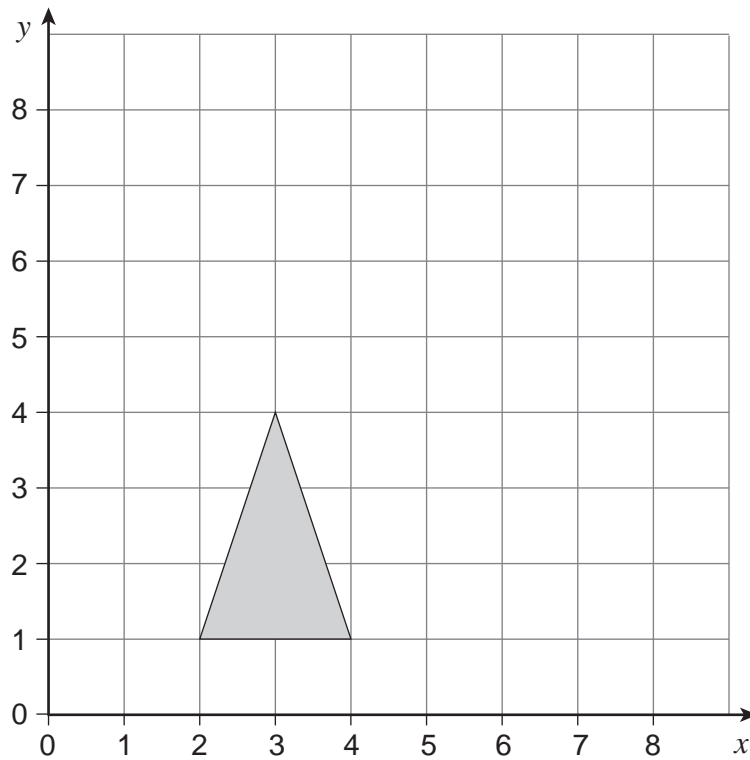
Answer £ \_\_\_\_\_

**Turn over for the next question**



11 (a) Reflect this triangle in the line  $y = 4$

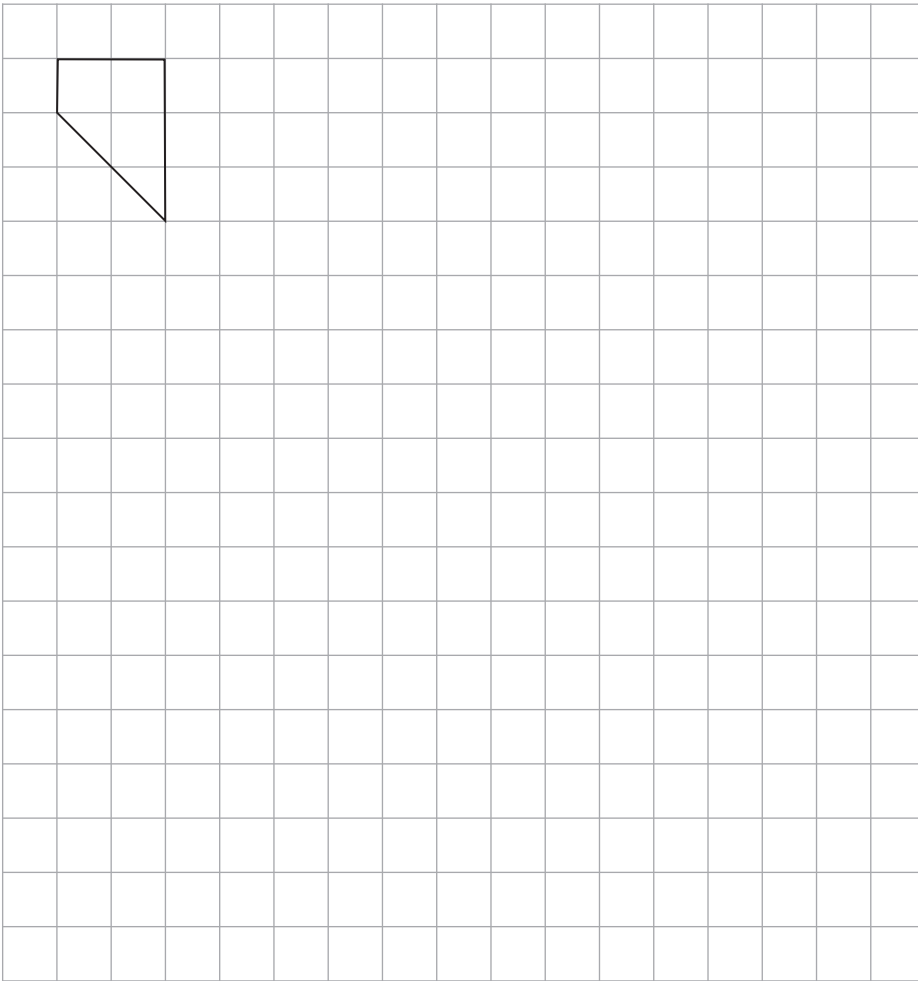
[2 marks]





11 (b) Enlarge this shape by scale factor 3

[2 marks]

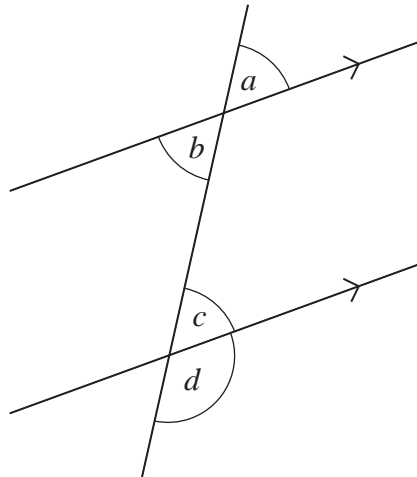


Turn over for the next question

Turn over ►



12



12 (a) Which angles are vertically opposite?  
Circle your answer.

[1 mark]

*a and b**a and c**b and c**b and d**c and d*

12 (b) Which angles are alternate?  
Circle your answer.

[1 mark]

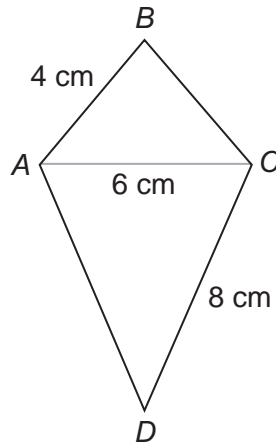
*a and b**a and c**b and c**b and d**c and d*

12 (c) Which angles are corresponding?  
Circle your answer.

[1 mark]

*a and b**a and c**b and c**b and d**c and d*

13

 $ABCD$  is a kite.

Not drawn accurately

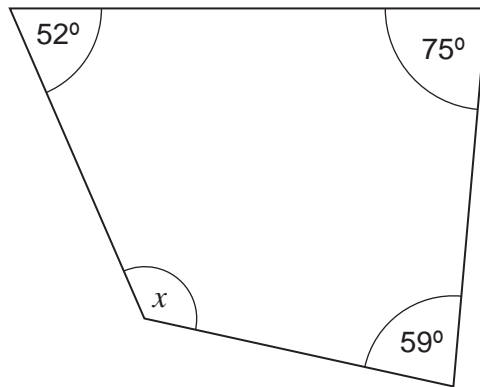
Using a ruler and compasses, make an accurate construction of the kite.  
 $AC$  has been drawn for you.

**[3 marks]**

Turn over ►



14 (a)



Not drawn accurately

Work out the value of  $x$ .**[2 marks]**

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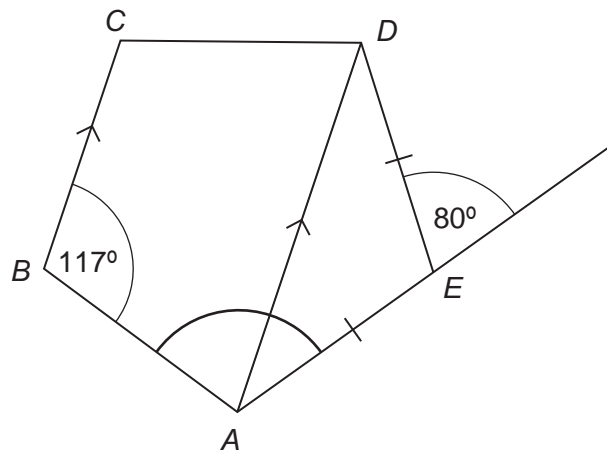
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Answer \_\_\_\_\_ degrees



14 (b)  $AD$  is parallel to  $BC$ .

$$AE = DE$$



Not drawn accurately

Work out the size of angle  $BAE$ .

[3 marks]

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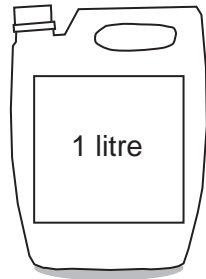
Answer \_\_\_\_\_ degrees

Turn over for the next question

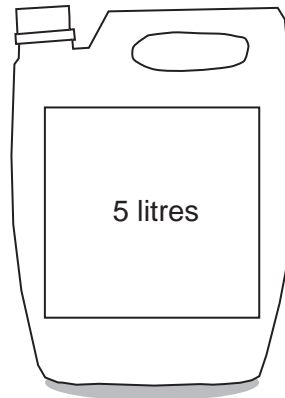


**\*15**

Oil is sold in two sizes.



£8.75



was £49.80

**now 15% off**

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

**[4 marks]**

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Answer \_\_\_\_\_



**16** Jack drives 95 miles.

He drives at an average speed of 38 mph  
He starts his journey at 7 am

What time does he arrive?

**[3 marks]**

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Answer \_\_\_\_\_

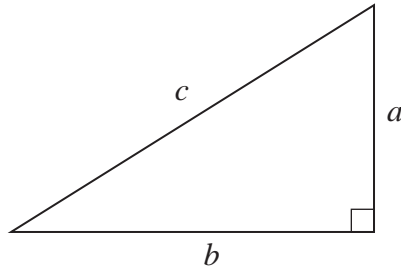
**Turn over for the next question**

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| 7 |
|---|

**Turn over ►**



- 17 (a) The diagram shows a right-angled triangle.



Circle the **two** correct formulae.

[2 marks]

$c = ab$

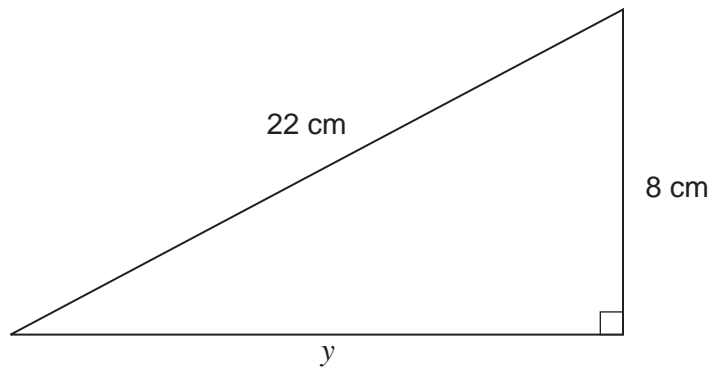
$c = a + b$

$c^2 = a^2 + b^2$

$c = \frac{1}{2} ab$

$c = \sqrt{a^2 + b^2}$

- 17 (b) Work out the length  $y$ .



Not drawn  
accurately

Give your answer to 1 decimal place.

[4 marks]

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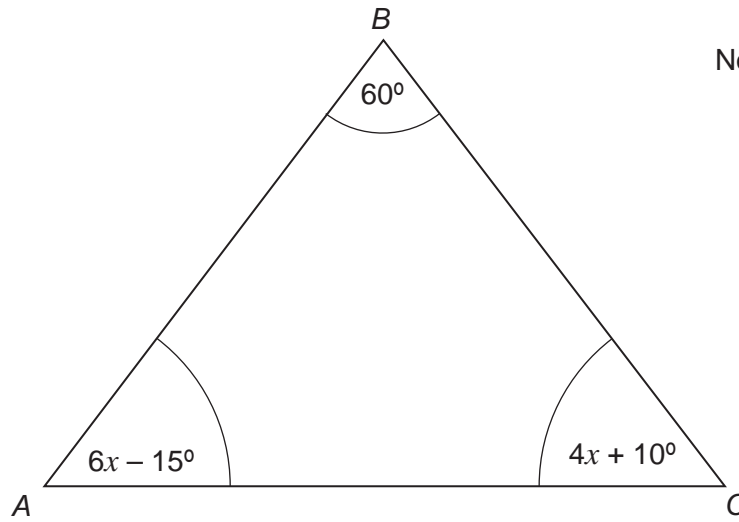
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Answer \_\_\_\_\_ cm





- \*18** Show that  $ABC$  is an equilateral triangle.



Not drawn accurately

[5 marks]

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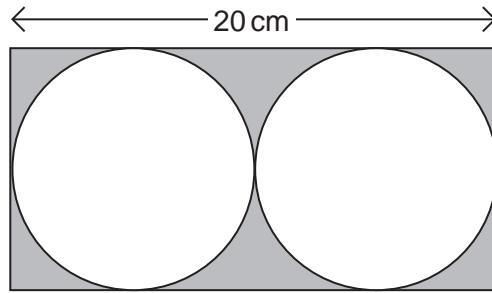
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- 19 Two identical circles fit inside a rectangle as shown.



Not drawn  
accurately

The length of the rectangle is 20 cm

Work out the area of the shaded section.

[6 marks]

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

**END OF QUESTIONS**



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