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|---------------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre Number       |  |  |  |  |  | Candidate Number |  |  |  |  |
| Surname             |  |  |  |  |  |                  |  |  |  |  |
| Other Names         |  |  |  |  |  |                  |  |  |  |  |
| Candidate Signature |  |  |  |  |  |                  |  |  |  |  |



General Certificate of Secondary Education  
Foundation Tier  
June 2014

# Mathematics

43603F

## Unit 3

Friday 13 June 2014 9.00 am to 10.30 am

**F**

|   |  |
|---|--|
| <p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>• a calculator</li> <li>• mathematical instruments.</li> </ul> |  |
|---|--|

### Time allowed

- 1 hour 30 minutes

### 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.
- 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.
- The quality of your written communication is specifically assessed in Questions 2 and 4. 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.

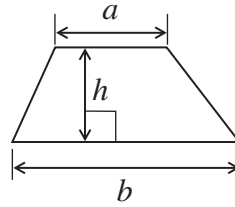
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| For Examiner's Use  |      |
| Examiner's Initials |      |
| Pages               | Mark |
| 3                   |      |
| 4 – 5               |      |
| 6 – 7               |      |
| 8 – 9               |      |
| 10 – 11             |      |
| 12 – 13             |      |
| 14 – 15             |      |
| 16 – 17             |      |
| 18 – 19             |      |
| 20 – 21             |      |
| 22 – 23             |      |
| 24 – 25             |      |
| 26 – 27             |      |
| TOTAL               |      |



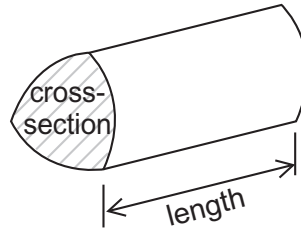
J U N 1 4 4 3 6 0 3 F 0 1

**Formulae Sheet: Foundation Tier**

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

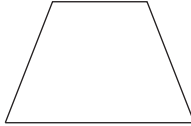


**Volume of prism** = area of cross-section  $\times$  length

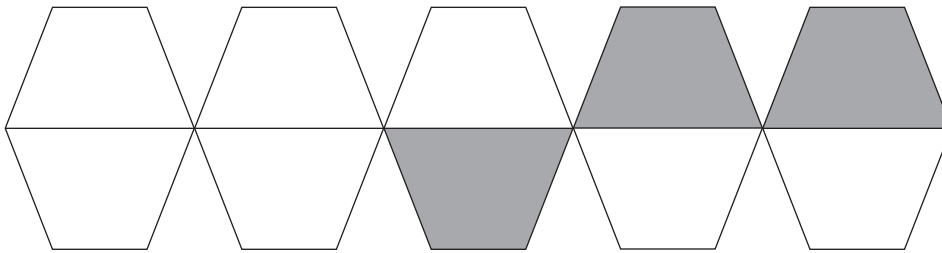


Answer **all** questions in the spaces provided.

**1** This shape is an isosceles trapezium.



Ten of these shapes are put together.



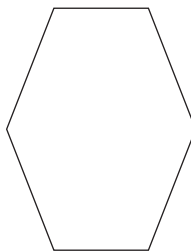
**1 (a)** What percentage of the ten shapes is shaded?

[1 mark]

Answer ..... %

**1 (b)** What is the mathematical name of the shape below?  
Circle your answer.

[1 mark]



Octagon

Pentagon

Hexagon

Decagon

2

Turn over ►



\*2 Work out which distance is longer,

20% of 320 miles or  $\frac{1}{2}$  of 130 miles.

You **must** show your working.

**[4 marks]**

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Answer .....



3 (a) Draw a circle with **diameter** 12 cm, centre  $P$ .

[2 marks]

•  $P$

3 (b) On your circle draw a sector of angle  $60^\circ$

[2 marks]

8

Turn over ►



\*4 A car owner is comparing the cost of repairing her car at two garages.

|          | Cost of labour per hour | Cost of parts |
|----------|-------------------------|---------------|
| Garage A | £64                     | £152          |
| Garage B | £93                     | £137          |

This formula is used to work out the total cost at each garage.

$$\text{Total cost} = \text{cost of labour} \times \text{number of hours} + \text{cost of parts}$$

The repair takes  $2\frac{1}{2}$  hours.

How much **cheaper** is garage A?

[5 marks]

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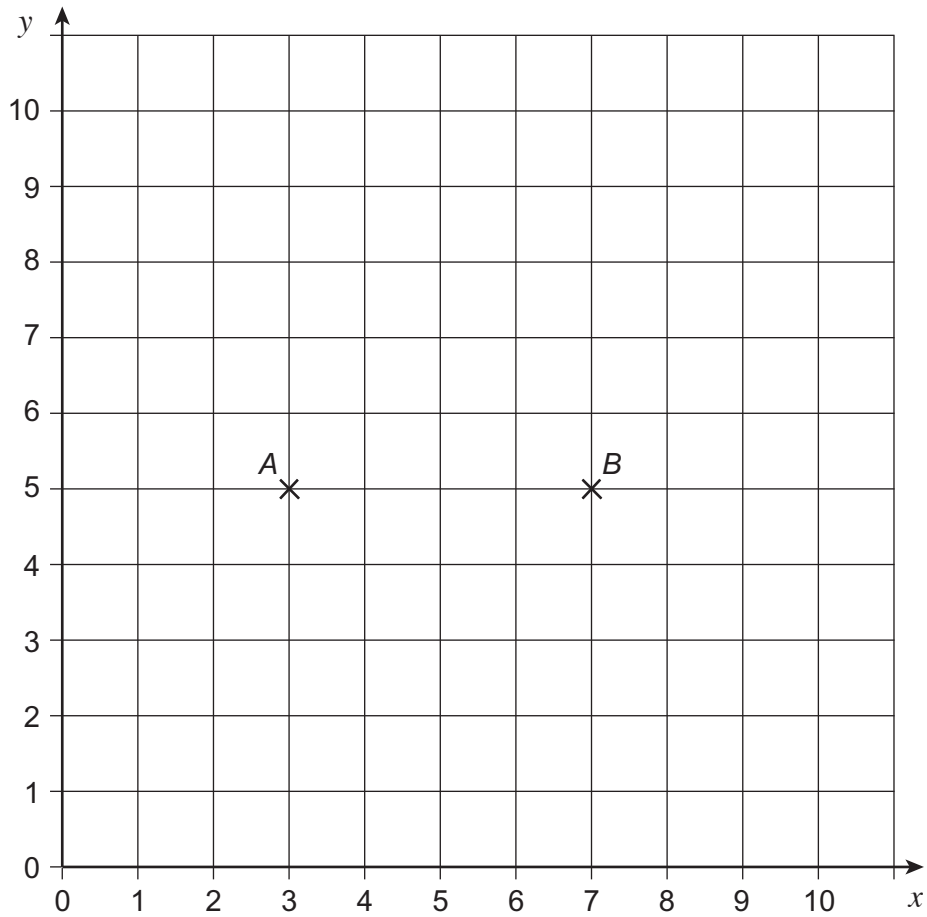
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Answer £ .....



- 5 Points  $A$  and  $B$  are shown on the centimetre grid.



- 5 (a) Draw a rectangle  $ABCD$  on the grid with area  $12 \text{ cm}^2$ .

[2 marks]

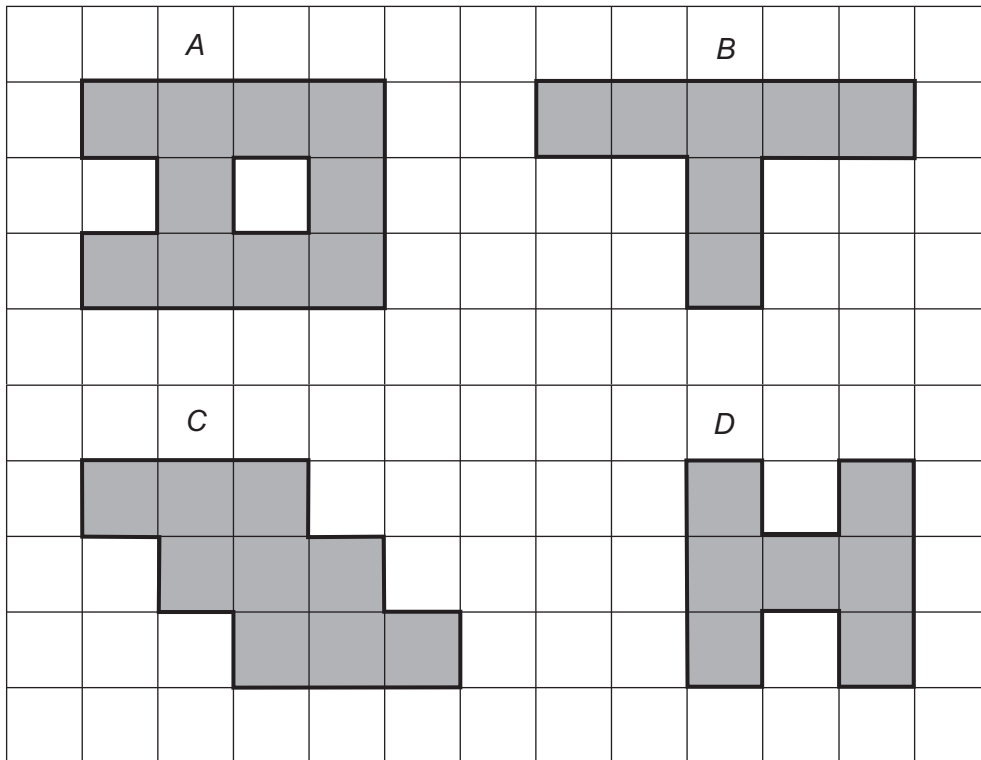
- 5 (b) Write down the coordinates of point  $C$  and point  $D$ .

[2 marks]

Answer  $C$  ( ..... , ..... ) and  $D$  ( ..... , ..... )



6 Here are four shapes.



Circle your answers for each part.

6 (a) Which of these shapes have line symmetry?

[2 marks]

A

B

C

D

6 (b) Which of these shapes have rotational symmetry of order 2?

[2 marks]

A

B

C

D





7 The diagram shows a map of Poland.



Use one of the following compass points to complete each sentence correctly.

- |            |            |            |            |
|------------|------------|------------|------------|
| North      | South      | East       | West       |
| North-East | North-West | South-East | South-West |

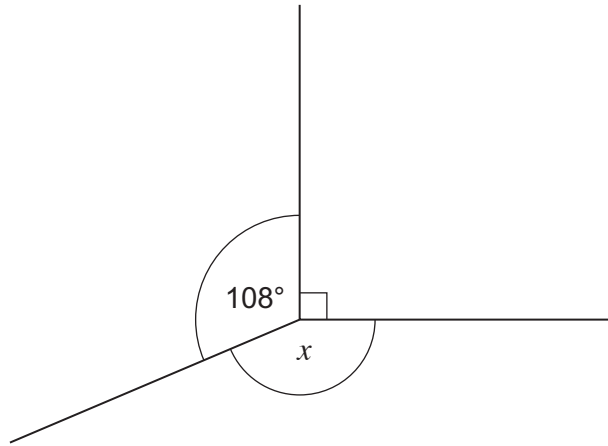
7 (a) Krakow is ..... of Gdansk. [1 mark]

7 (b) Gdansk is ..... of Poznan. [1 mark]



8 (a) Work out the size of angle  $x$

[2 marks]

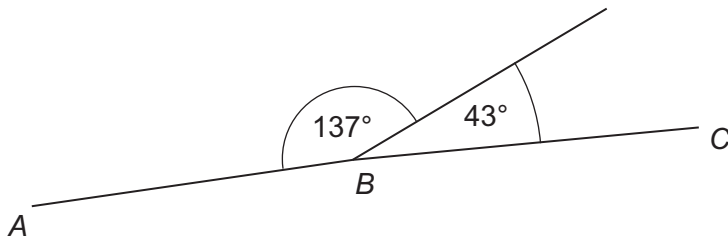


Not drawn  
accurately

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.....

Answer ..... degrees

8 (b)



Not drawn  
accurately

Give a reason why, if drawn accurately,  $ABC$  would be a straight line.

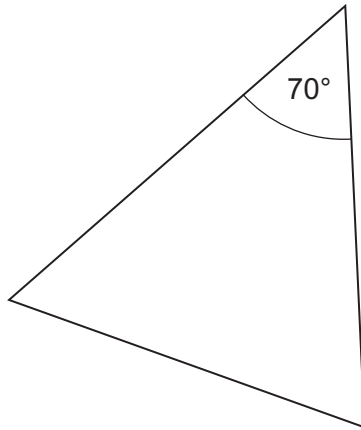
[1 mark]

.....  
.....



9 This triangle is isosceles.

Not drawn  
accurately



Work out the angles of the **two** possible triangles.

[3 marks]

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70°, ....., .....

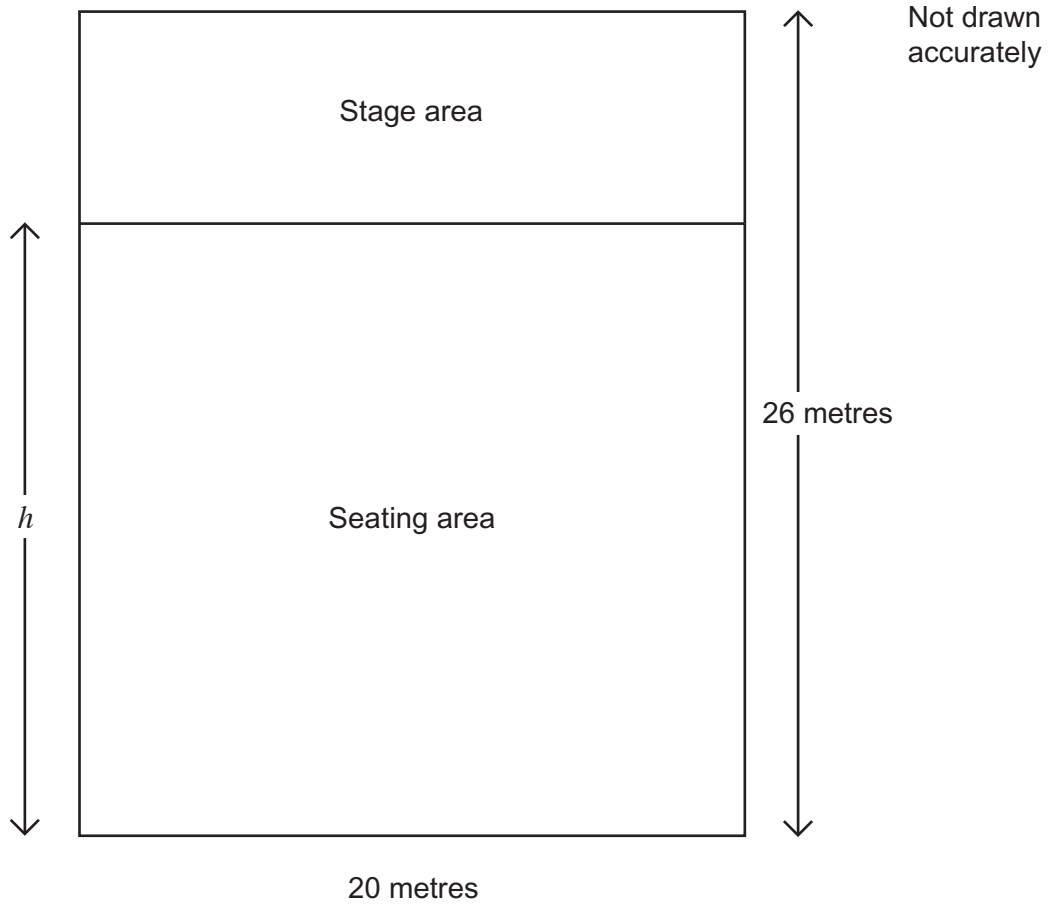
and 70°, ....., .....

6

Turn over ►



- 10** The diagram shows a plan of a rectangular school hall.



- 10 (a)** The stage area is one-quarter of the area of the school hall.

Work out the length  $h$

**[3 marks]**

.....

.....

Answer ..... metres



**10 (b)** In the seating area

the maximum number of rows allowed is 13  
the maximum number of seats allowed in a row is 16.

There are the same number of seats in each row.  
Altogether there are 168 seats.

Work out the number of rows and the number of seats in each row.  
You **must** show your working.

**[3 marks]**

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Number of rows .....

Number of seats in each row .....

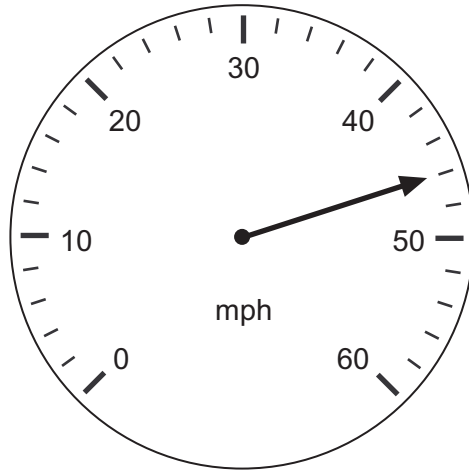
|   |
|---|
| 6 |
|---|

Turn over ►



11 (a) Write down the speed shown on the speedometer.

[1 mark]



Answer ..... mph

11 (b) A car travels for 1 hour 30 minutes at an average speed of 28 mph.

How many miles does the car travel?

[3 marks]

.....  
.....  
.....

Answer ..... miles



**12** Circle the correct words to complete each sentence.

**12 (a)**  $5x + 1 = 16$  is

[1 mark]

an expression

an equation

a formula

**12 (b)**  $V = \pi r^2 h$  is

[1 mark]

an expression

an equation

a formula

**12 (c)**  $x + 3$  is

[1 mark]

an expression

an equation

a formula

**12 (d)**  $2x + 3y$  is

[1 mark]

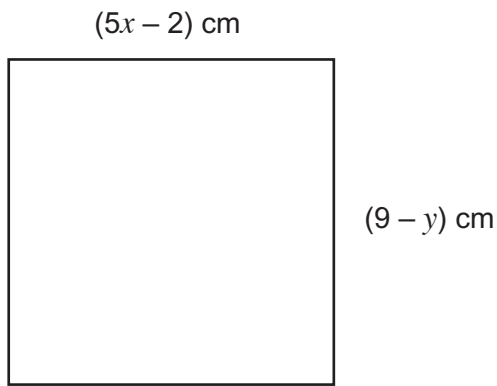
an expression

an equation

a formula



13 The diagram shows a square with area  $64 \text{ cm}^2$ .



Not drawn  
accurately

Work out the values of  $x$  and  $y$ .

[4 marks]

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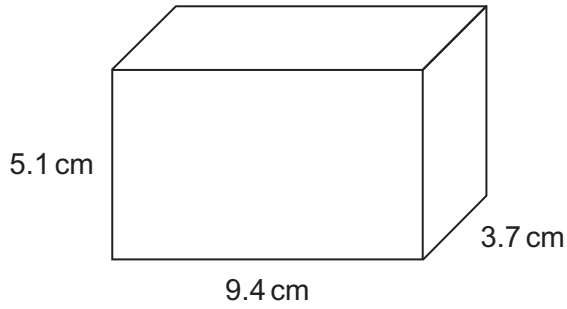
$x =$  .....

$y =$  .....





14 The diagram shows a cuboid.



The cuboid is enlarged by scale factor 4.

14 (a) Work out the dimensions of the enlarged cuboid.

[2 marks]

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Answer ..... cm , ..... cm , ..... cm

14 (b) How many times bigger is the volume of the enlarged cuboid than the volume of the original cuboid?

[2 marks]

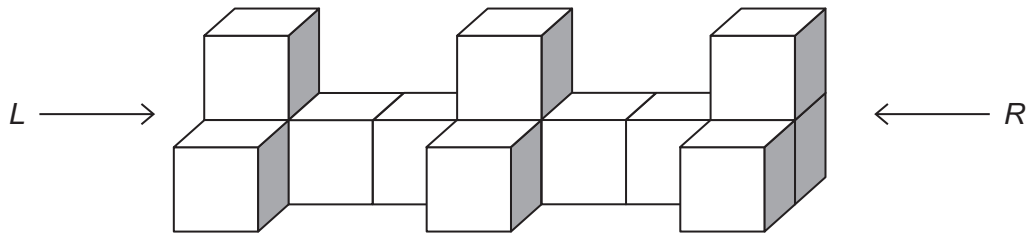
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Answer .....



15 This solid shape is made from identical cubes.

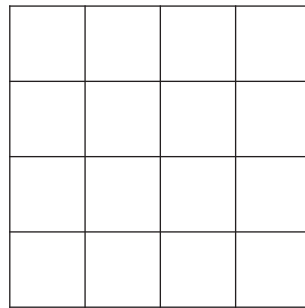
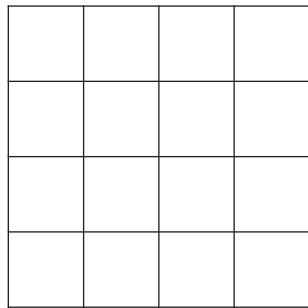


15 (a) On the grids draw the side elevations *L* and *R*.

[2 marks]

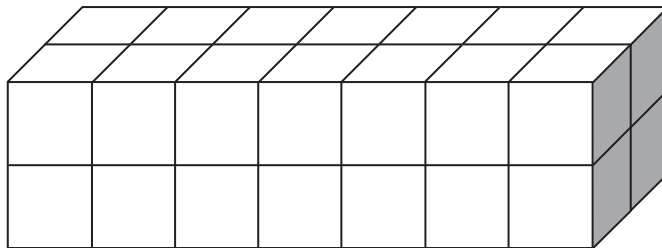
*L*

*R*



15 (b) How many cubes must be **added** to the shape to make this cuboid?

[2 marks]

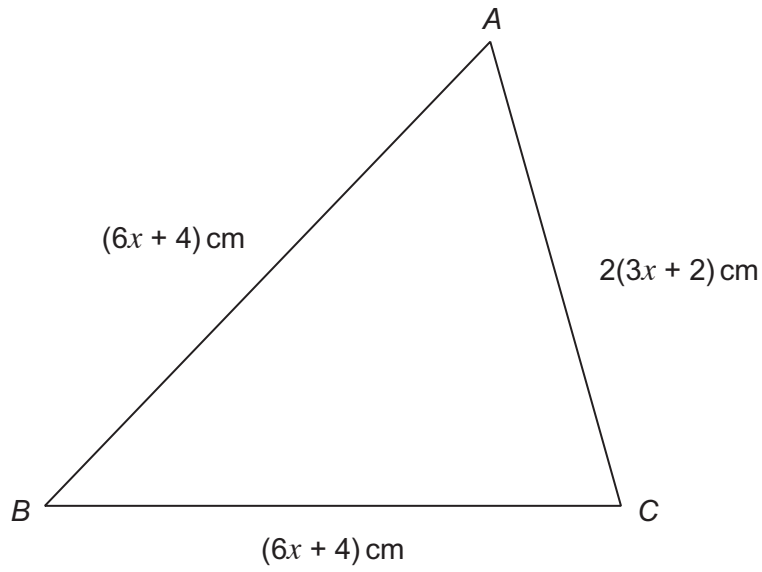


.....

Answer .....



16 The diagram shows a triangle.



Not drawn  
accurately

What type of triangle is it?  
Give a reason for your answer.

[2 marks]

Answer .....

Reason .....

.....

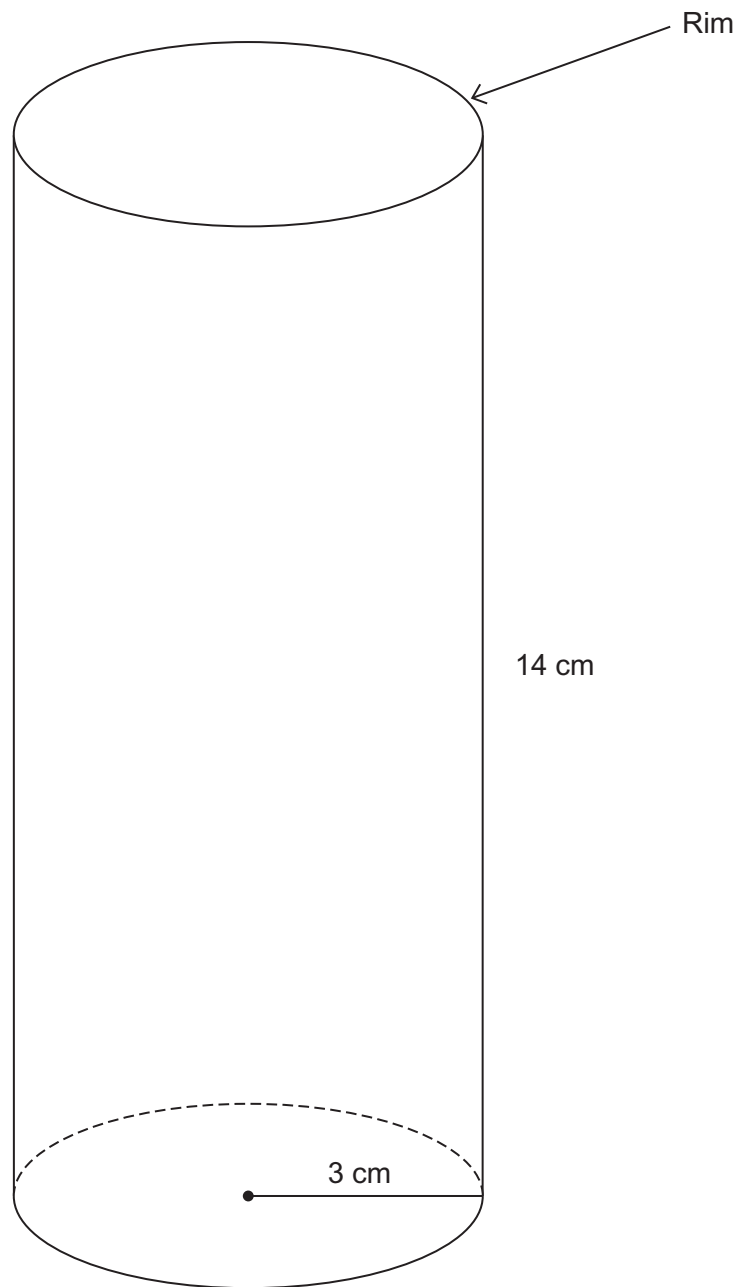
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6

Turn over ►



- 17 The diagram shows a full-size drawing of a drinking glass.  
The glass is a cylinder with radius 3 cm and height 14 cm.



A man claims that the circumference of the rim is greater than the height of the glass.

Is he correct?

You **must** show your working.

**[2 marks]**

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Answer .....

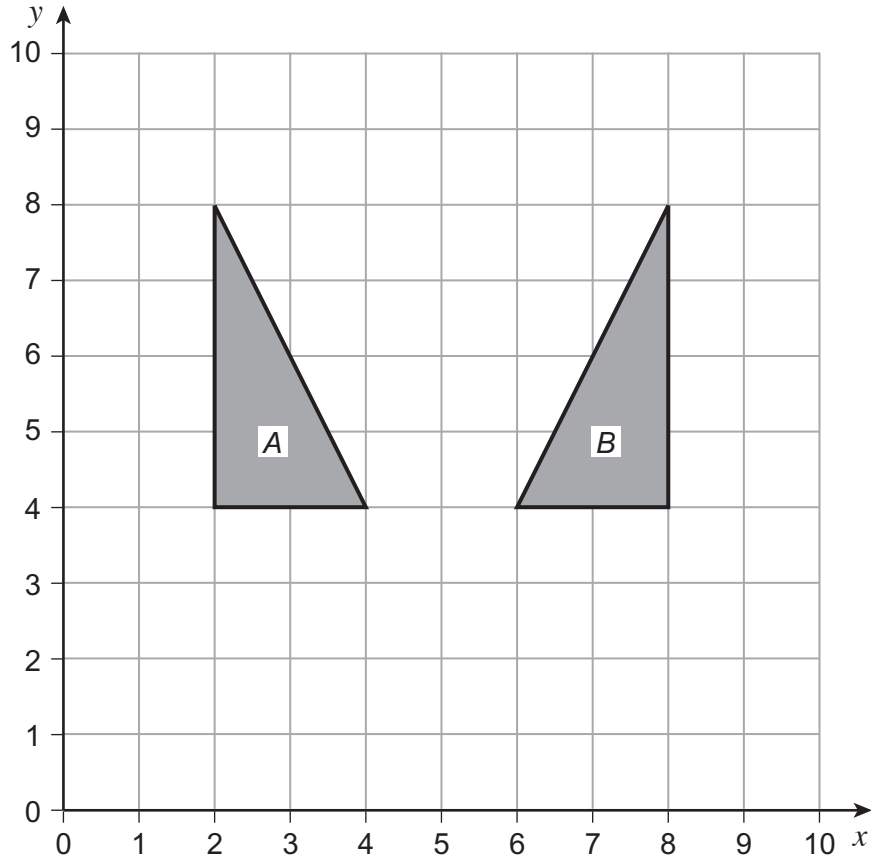
**Turn over for the next question**

2

**Turn over ►**



18



Describe fully the **single** transformation that maps shape A to shape B.

[2 marks]

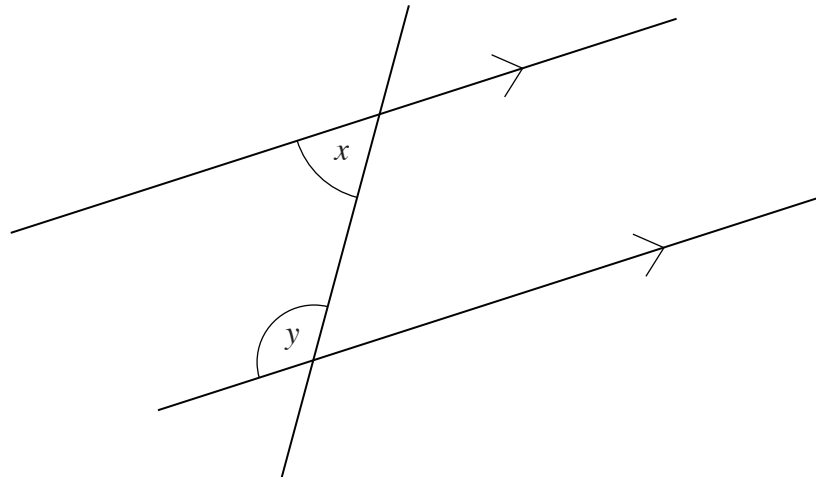
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19

Not drawn  
accurately



19 (a) Use the diagram to write an equation connecting  $x$  and  $y$ .

[1 mark]

Answer .....

19 (b) The ratio  $x : y = 2 : 3$

Use this information to write another equation connecting  $x$  and  $y$ .

[1 mark]

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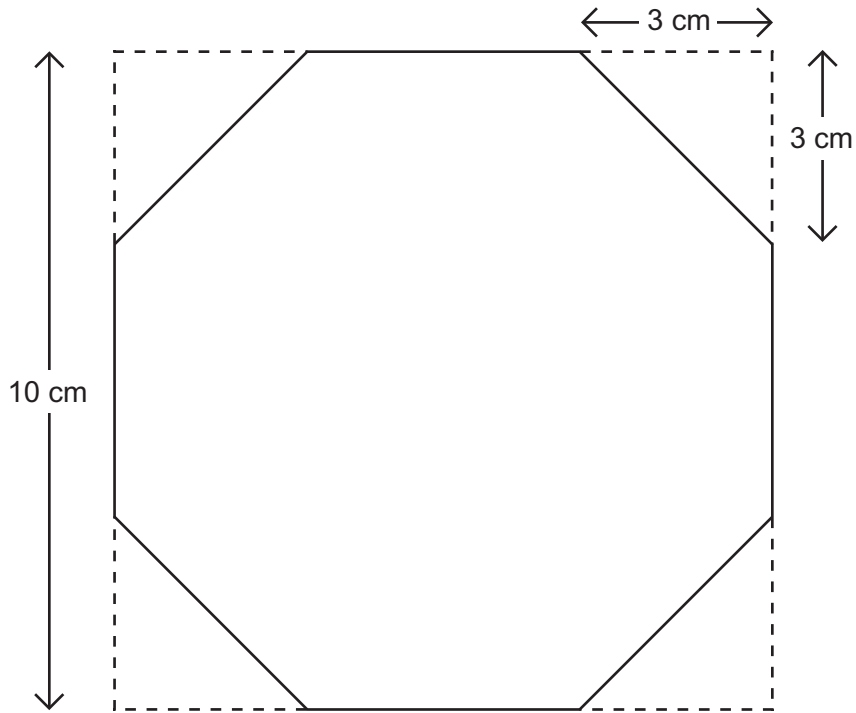
Answer .....

4

Turn over ►



**20** An octagon is made by cutting four identical triangles from a square sheet of gold as shown.



Not drawn  
accurately

**20 (a)** Show that the area of the octagon is  $82 \text{ cm}^2$ .

**[4 marks]**

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**20 (b)** The original square sheet of gold has a value of £750

The octagon shape is made into a piece of jewellery.  
This increases the value of the gold in the octagon shape by 90%

Work out the new value of the gold in the octagon shape.

**[4 marks]**

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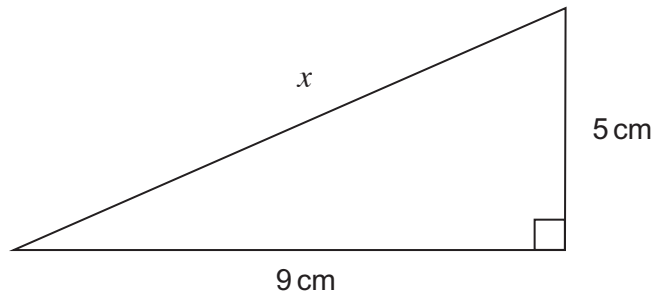
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Answer £ .....

**Turn over for the next question**



21

Not drawn  
accurately

Work out the length  $x$   
Give your answer to 1 decimal place.

**[4 marks]**

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.....

Answer ..... cm



22

You will need a ruler and compasses for this question.

Draw accurately the locus of a point which is always 5 cm from the line.

**[3 marks]****END OF QUESTIONS**

7



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**

