AQA

General Certificate of Secondary Education
Foundation Tier
June 2015

Methods in Mathematics (Linked Pair)   **93652F**

F

Unit 2   **Geometry and Algebra**

Monday 8 June 2015   9.00 am to 10.30 am

For this paper you must have:
- a calculator
- mathematical instruments.

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. 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
- The quality of your written communication is specifically assessed in Questions 9, 11, 15 and 25
  These questions are indicated with an asterisk (*).
- You may ask for more answer paper, tracing paper and graph paper.
- These must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

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

93652F

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$
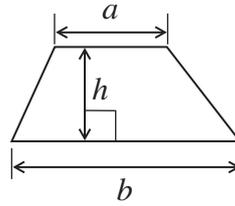
Volume of prism = area of cross section × length
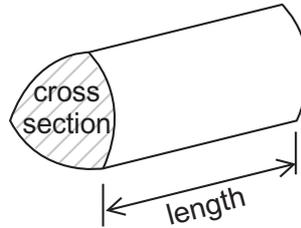
Answer **all** questions in the spaces provided.

1 (a) Draw a **diameter** on this circle.

[1 mark]
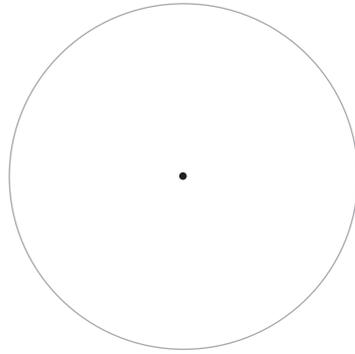
1 (b) Draw an **arc** on this circle.

[1 mark]
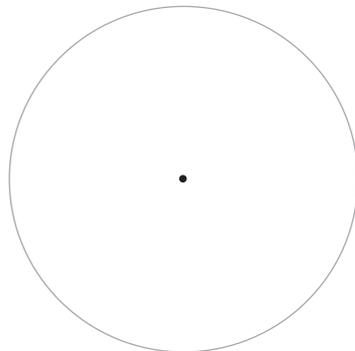
Turn over for the next question

Turn over ▶

2   *AB* is a straight line.
x is an obtuse angle.
y is an acute angle.
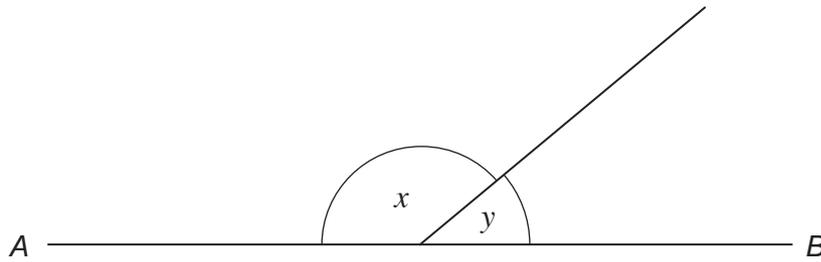
Not drawn
accurately

Write down a pair of possible values for x and y.

[2 marks]

....

x = ... degrees

y = ... degrees

3 (a)   Shade 20% of this grid.

[1 mark]
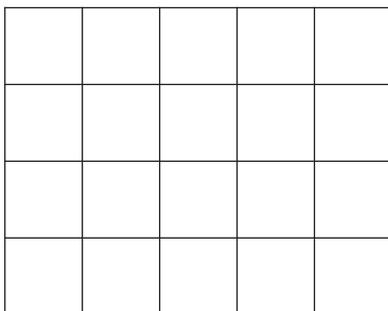
3 (b)   Here is another grid.
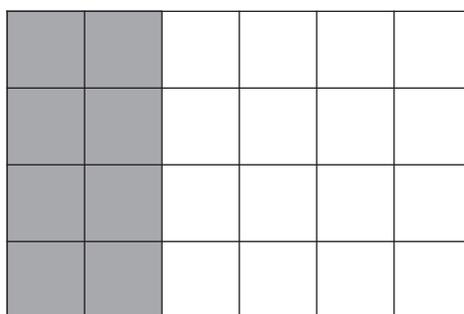
Circle the fraction of the grid which is shaded.

[1 mark]

$\dfrac{1}{7}$ $\dfrac{1}{5}$ $\dfrac{1}{4}$ $\dfrac{1}{3}$ $\dfrac{1}{2}$

3 (c)   Here is the same grid as part (b).
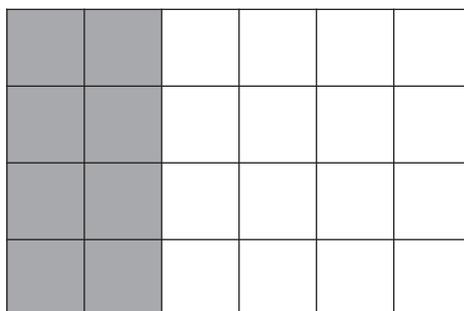
Circle the ratio which represents   shaded squares : unshaded squares

[1 mark]

1 : 2   1 : 3   1 : 4   1 : 6

5

Turn over ▶

4 (a) Work out the answer to $3 + 4 \times 2 + 6$

[1 mark]

....

Answer ....

4 (b) Work out 2×6^2

[1 mark]

....

....

Answer ....

4 (c) Add **one** set of brackets to make this calculation correct.

[1 mark]

$$3 \times 4 + 2 - 6 = 0$$

5 (a)   Use your calculator to work out $\dfrac{23.5 \times 11.2}{16}$

[1 mark]

Answer ....

5 (b)   Use your calculator to work out $\sqrt{360}$
Write the full calculator display.

[1 mark]

Answer ....

5 (c)   Give your answer to part (b) to 3 decimal places.

[1 mark]

Answer ....

Turn over for the next question

6

6   The **sum** of two numbers is 14
The **difference** between the two numbers is 8

Work out the two numbers.

[2 marks]

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Answer .... and ....

7 (a)   Mark the midpoint of the line *AB*.

[1 mark]
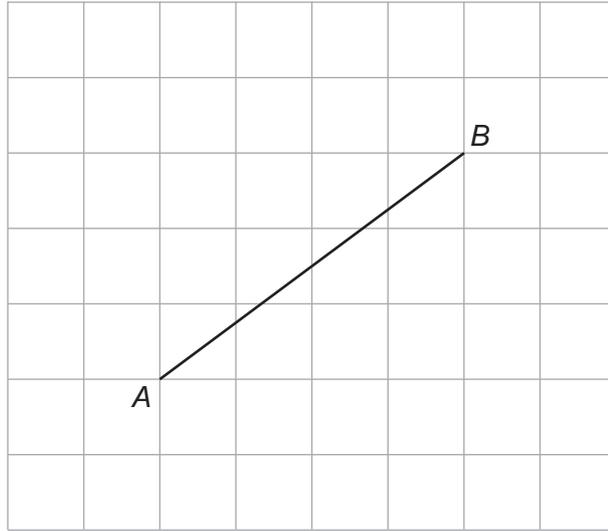
7 (b)   Draw a line perpendicular to the line *CD*.

[1 mark]

Turn over for the next question

4
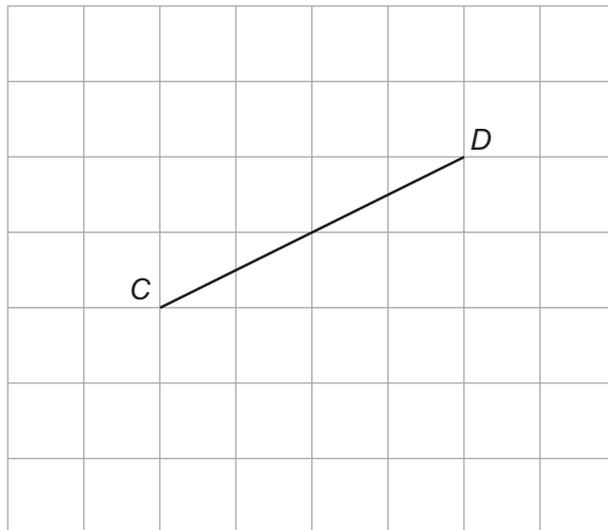
Turn over ▶

8   Here is a list of numbers.

10   12   17   27   36   48

From the list

8 (a)   write down the factor of 24

[1 mark]

Answer ....

8 (b)   write down the square number

[1 mark]

Answer ....

8 (c)   write down the cube number

[1 mark]

Answer ....

8 (d)   write down the prime number.

[1 mark]

Answer ....

9 Here is a sequence.

25 $21\frac{1}{2}$ 18 $14\frac{1}{2}$ 11 ....

9 (a) What is the next term in the sequence?

[1 mark]

Answer ....

9 (b) Write down the rule for continuing the sequence.

[1 mark]

....

9 (c) What is the first **negative** number in the sequence?

[1 mark]

....

Answer ....

***9 (d)** Here is another sequence.

1 3 9 27 81 ....

Is 729 a number in the sequence?

Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

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Turn over ▶

10   Five shapes are drawn on a centimetre grid.
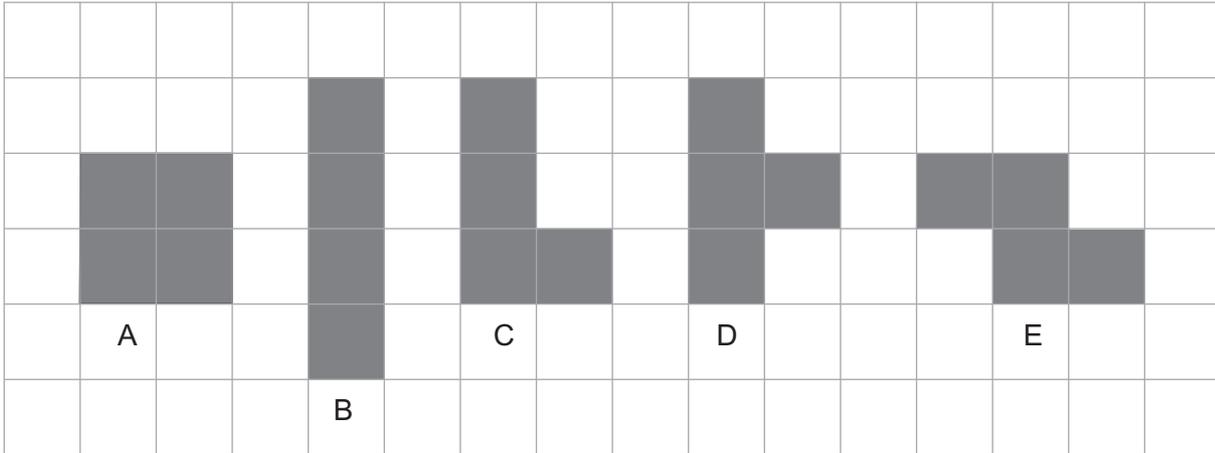
10 (a)   Which shape has **exactly** one line of symmetry?
Circle the correct letter.

[1 mark]

A   B   C   D   E

10 (b)   Which **two** shapes have rotational symmetry of order 2?
Circle the correct letters.

[2 marks]

A   B   C   D   E

10 (c)   Which shape has **no** line symmetry and **no** rotational symmetry?
Circle the correct letter.

[1 mark]

A   B   C   D   E

10 (d)   Bob says,

"The shapes all have the same perimeter."

Is he correct?

Tick a box.

Yes ☐   No ☐

Give a reason for your answer.

[1 mark]

....

....

10 (e)   Show that shape E will tessellate.

Draw at least 6 more shapes.

[1 mark]
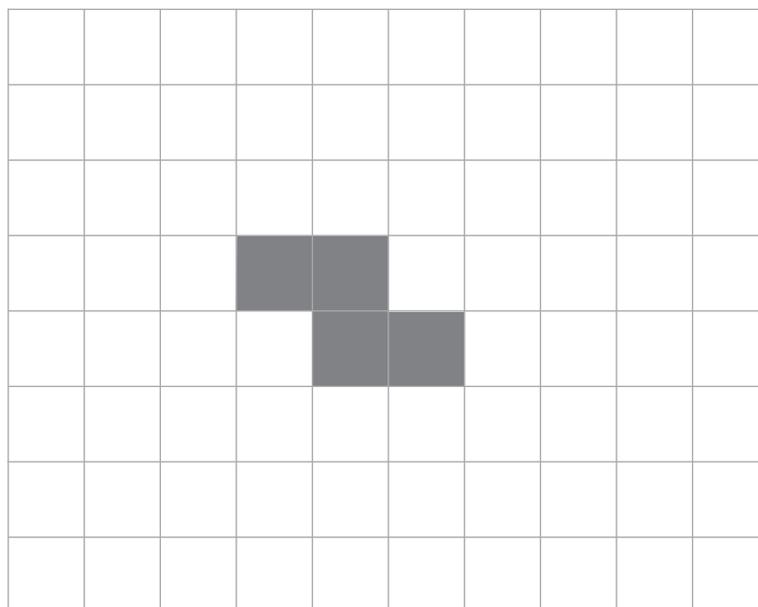
6

Turn over ▶

*11   Here are a cuboid and a cube.

3 cm

8 cm

5 cm

5 cm
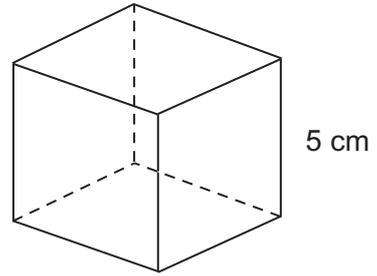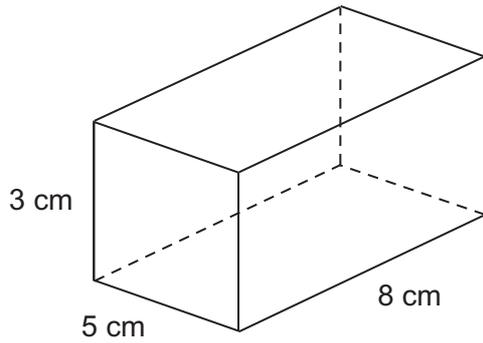
Which has the greater volume?
You **must** show your working.

[3 marks]

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12   Shade 4 squares so this pattern has only **one** line of symmetry.

Draw your line of symmetry on your diagram.

[2 marks]

Use this grid for practice.
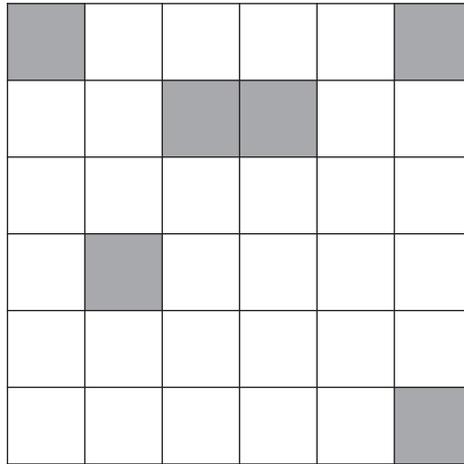
Use this grid for your answer.

5

WMP/Jun15/93652F
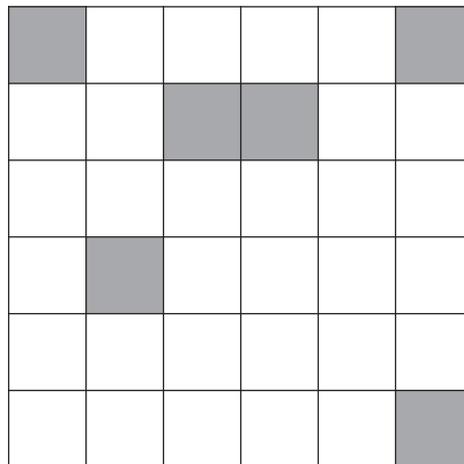
13 6 grey and 6 white centimetre cubes are made into a cuboid as shown.
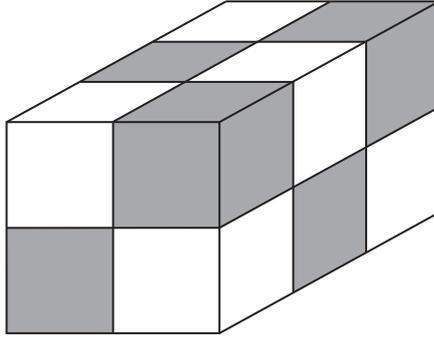
On the net of the cuboid the top and the two square ends are shaded correctly.

Complete the net by adding the correct shading.

[2 marks]
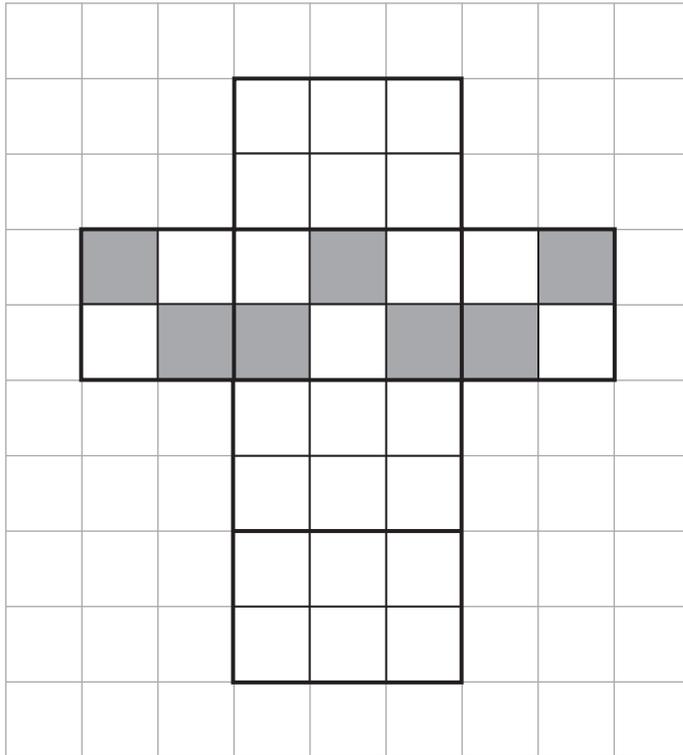
14   Points *A*, *B* and *C* are plotted on the grid.
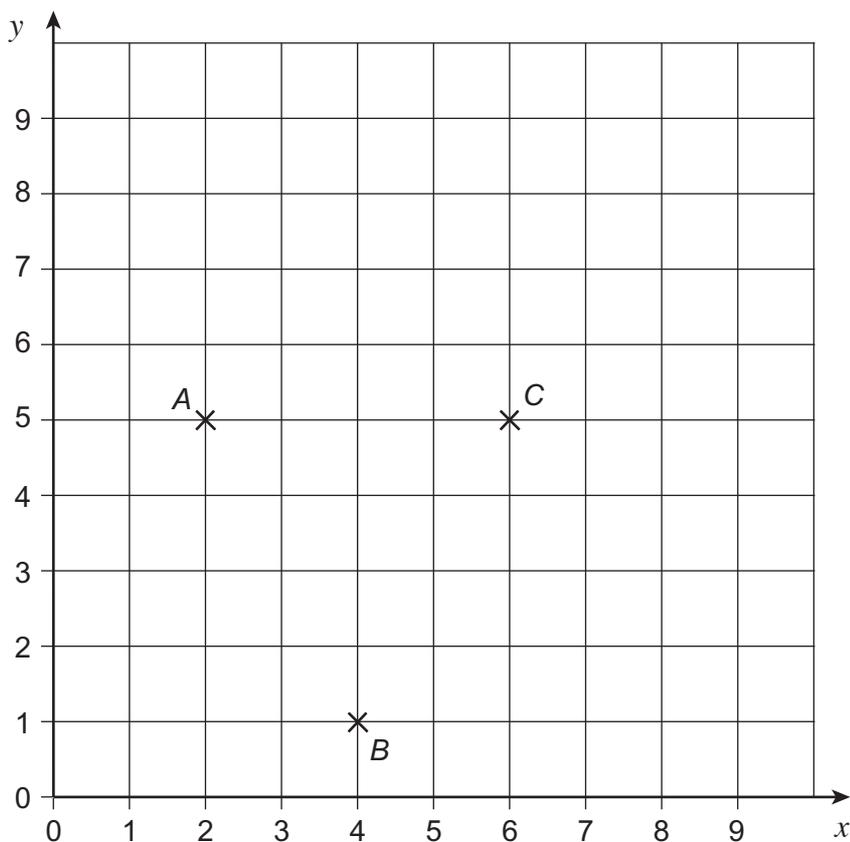
14 (a)   *ABCD* is a rhombus.
Write down the coordinates of *D*.

[1 mark]

Answer (.................. , ...)

14 (b)   *ABCE* is a kite.
Write down the coordinates of one possible position of *E*.

[1 mark]

Answer (.................. , ...)

Turn over ▶

4

*15 Here are three triangles.

Not drawn accurately

A 60° 60° 12 cm

5 cm B 13 cm 12 cm

12 cm C 8 cm
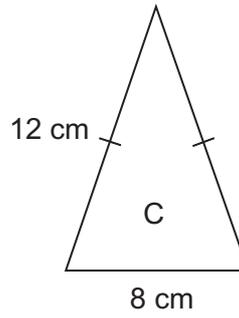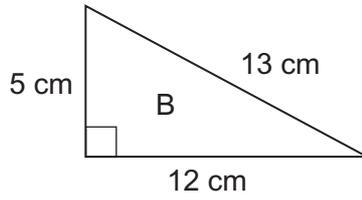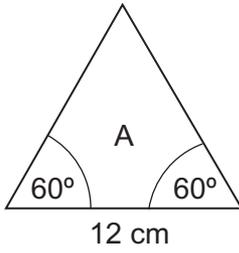
Which triangle has the **shortest** perimeter?
You **must** show your working.

[3 marks]

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Answer ....

16 The diagram shows a rectangle.

4x cm

Not drawn accurately

2x cm
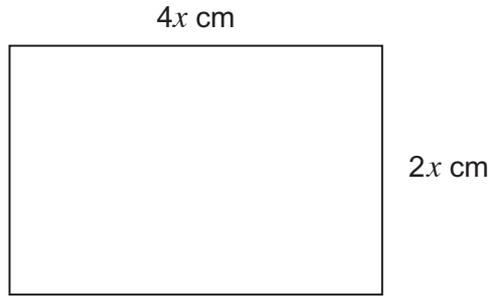
16 (a) Work out the area of the rectangle when $x = 3.25$

[2 marks]

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....

....

Answer .... cm^2

16 (b) Write down an algebraic expression for the perimeter of the rectangle.
Simplify your answer.

[2 marks]

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Answer ....

Turn over for the next question

7

Turn over ▶

17 A quadrilateral has one side extended as shown.
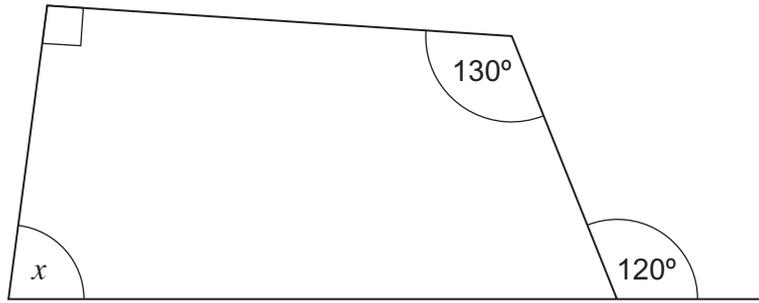
Not drawn accurately

Work out the size of angle x.

[3 marks]

....

....

....

....

Answer .... degrees

18 Work out the circumference of a circle with a radius of 15 cm

[2 marks]

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Answer .... cm

Turn over for the next question

Turn over ▶

19 Work out the area of this shape.

5 cm

6 cm

6 cm

Not drawn accurately

9 cm
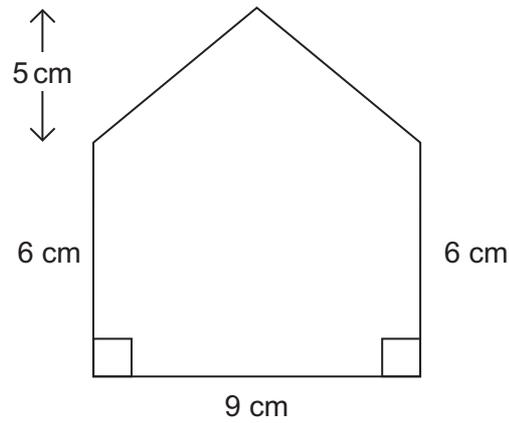
[3 marks]

Answer .... cm²

20   Four straight lines intersect as shown.
Two of the lines are parallel.
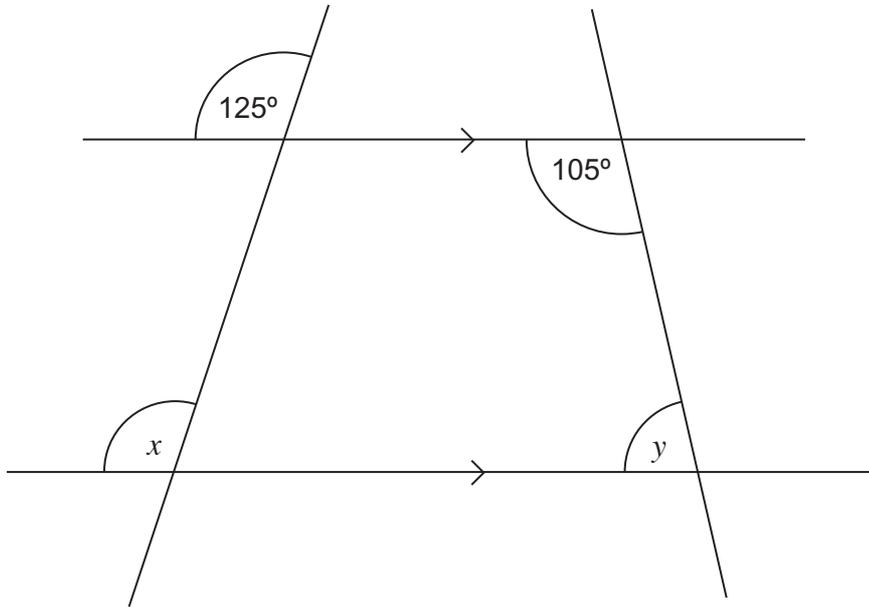
Not drawn accurately

20 (a)   Write down the size of angle x.
Give a reason for your answer.

[2 marks]

Angle .... degrees

Reason ....

20 (b)   Work out the size of angle y.

[1 mark]

....

Answer .... degrees

6

Turn over ▶

21 (a)   Enlarge the shape by a scale factor of 4

[2 marks]
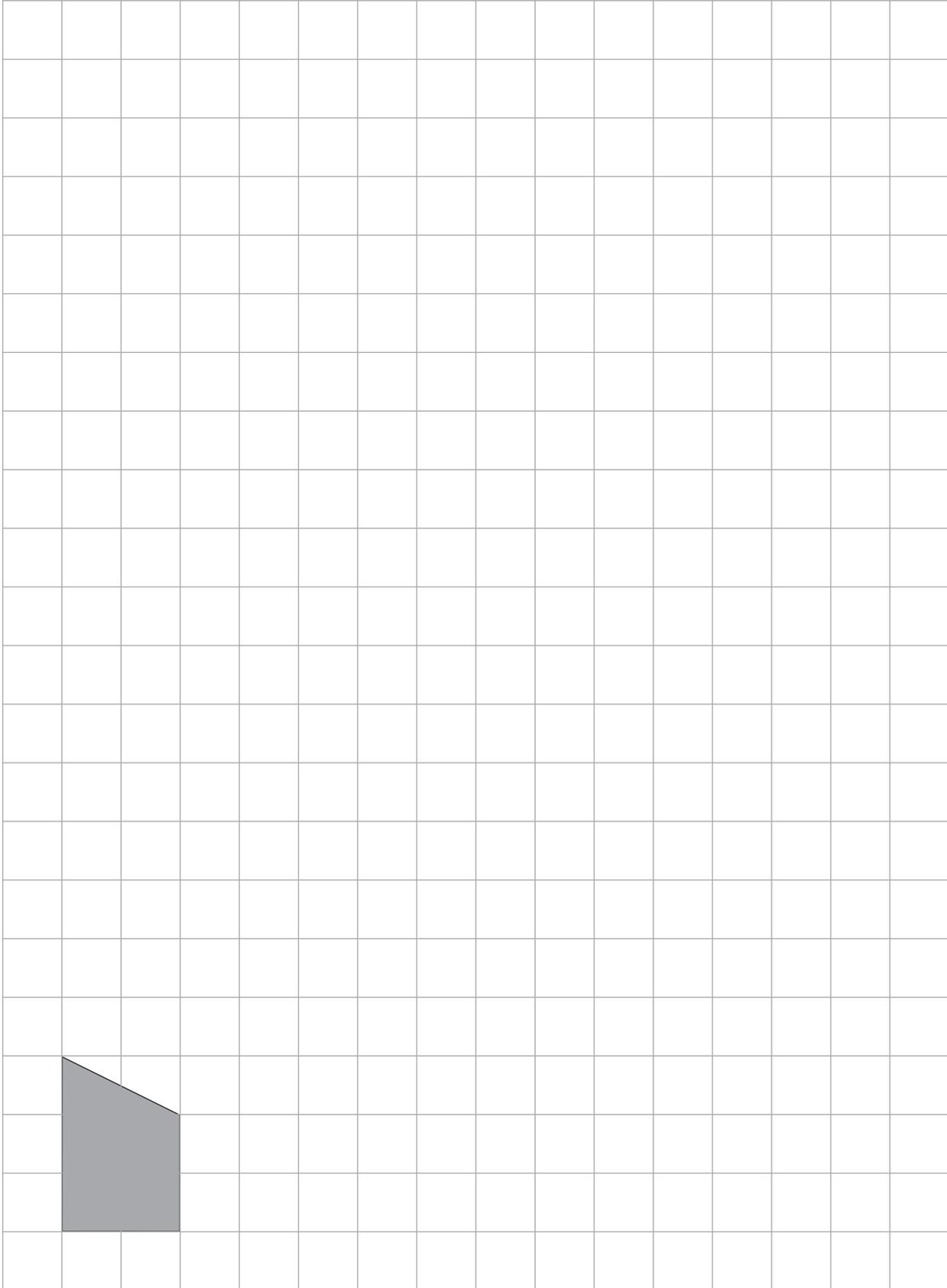
21 (b) Describe the **single** transformation that maps shape A to shape B.

[2 marks]

Answer ....

Turn over for the next question

4
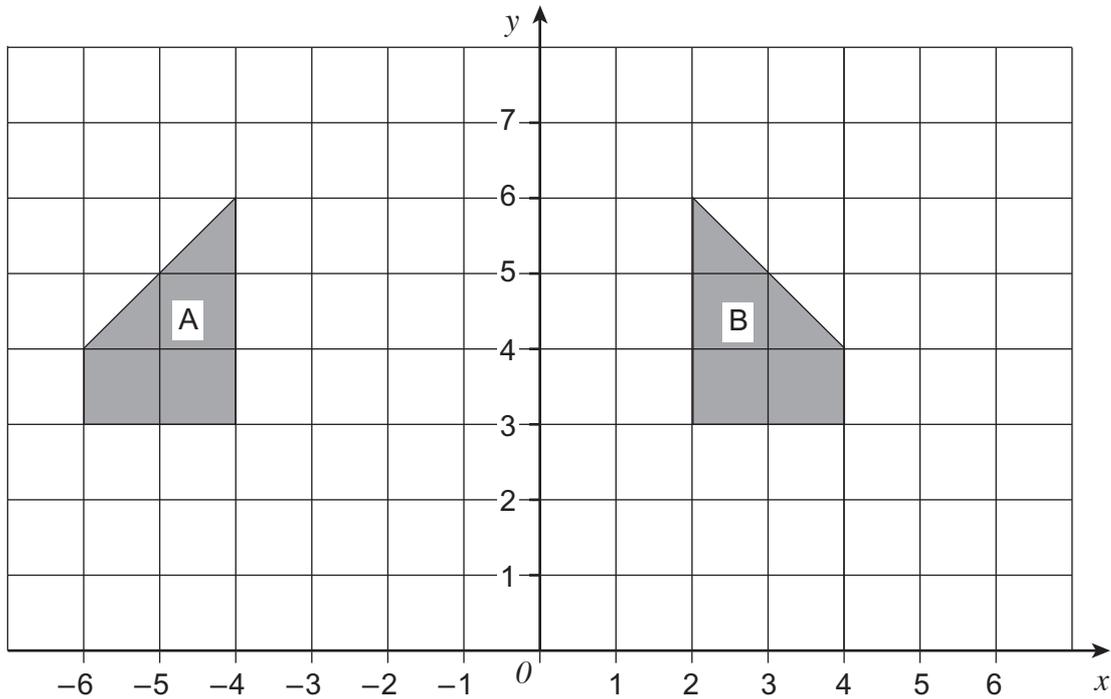
Turn over ▶

22   On the centimetre grid draw a parallelogram with an area of 20 cm^2

[2 marks]
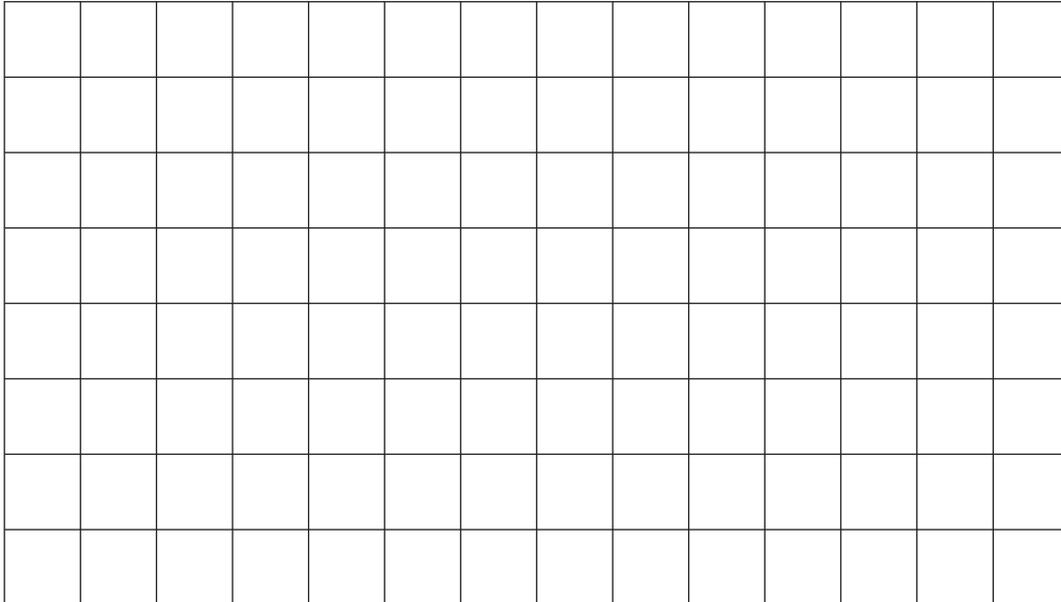
23 a and b are prime numbers.

27ab = 405

Work out the values of a and b.

[2 marks]

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Answer .... and ....

Turn over for the next question

4

Turn over ▶

24 A cylinder has radius 20 cm and height 45 cm
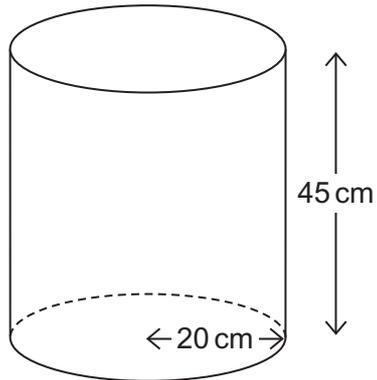
[3 marks]

Work out the volume of the cylinder.
Give your answer as a multiple of π.

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Answer .... cm^3

*25   A framework is made from white rods and black rods.

White rods are x cm long.
Black rods are $(x + 7)$ cm long.
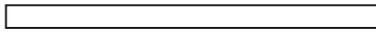
x cm

$(x + 7)$ cm

Not drawn
accurately
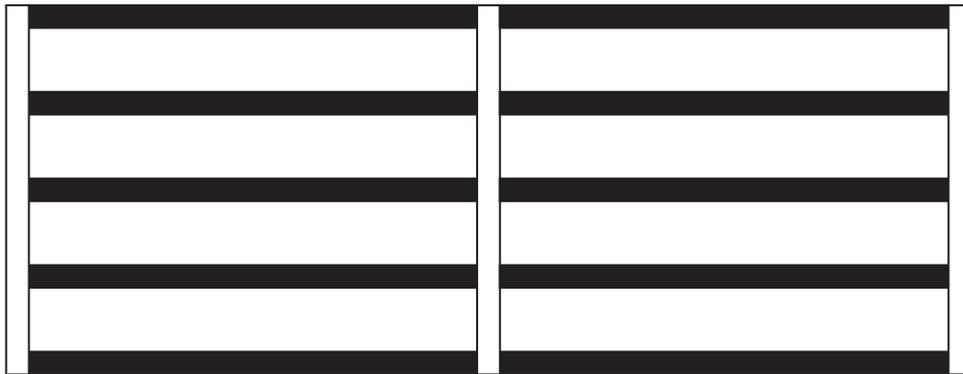
The total length of all the rods in the framework is 343 cm
Work out the value of x.

[4 marks]

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$x =$ ....

Turn over for the next question

Turn over ▶

26 (a)   Circle the least common multiple (LCM) of 8 and 12

[1 mark]

1   4   24   48   96

26 (b)   Part of a number line is shown.

A is the fraction $\dfrac{3}{8}$

B is the fraction $\dfrac{5}{12}$

P is halfway between *A* and *B*.

$$
\begin{array}{ccc}
A & P & B \\
\dfrac{3}{8} & & \dfrac{5}{12}
\end{array}
$$
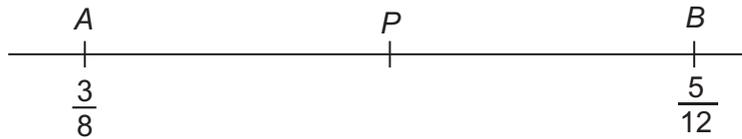
Work out the value of *P*.
Give your answer as a fraction in its simplest form.

[3 marks]

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....

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Answer ....

27 Work out the length x.

39 cm

x

Not drawn accurately

80 cm
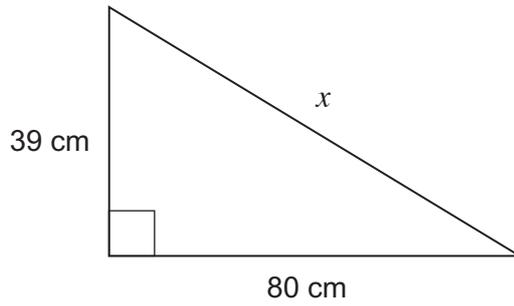
[3 marks]

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Answer .... cm

END OF QUESTIONS

7

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED