

Week 21

Circles and 2D Shapes

Name: _____

Class: _____

Date: _____

Time:

Marks: **41 marks**

Comments:

1

A bicycle wheel has a diameter of 64 cm.

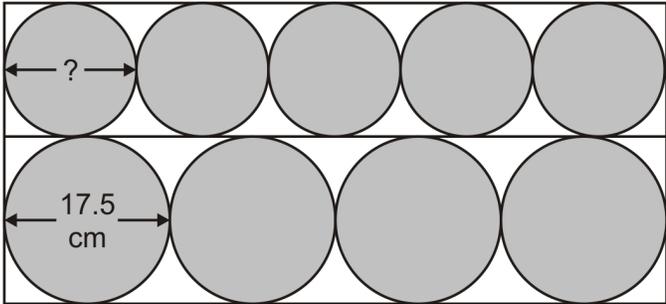
What is the **radius** of the bicycle wheel?

_____ cm

1 mark

2

Four large circles and five small circles fit exactly inside this rectangle.



Not actual size

The **diameter** of a large circle is **17.5** centimetres.

Calculate the **diameter** of a small circle.

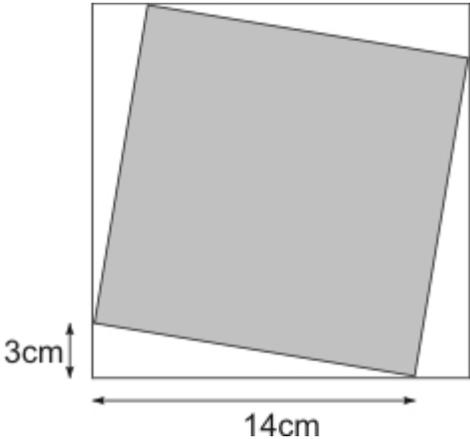
Show your method

_____ cm

2 marks

3

The diagram shows a shaded square inside a larger square.



Calculate the area of the **larger square**.

cm²

1 mark

Calculate the area of the **shaded square**.

Show your method

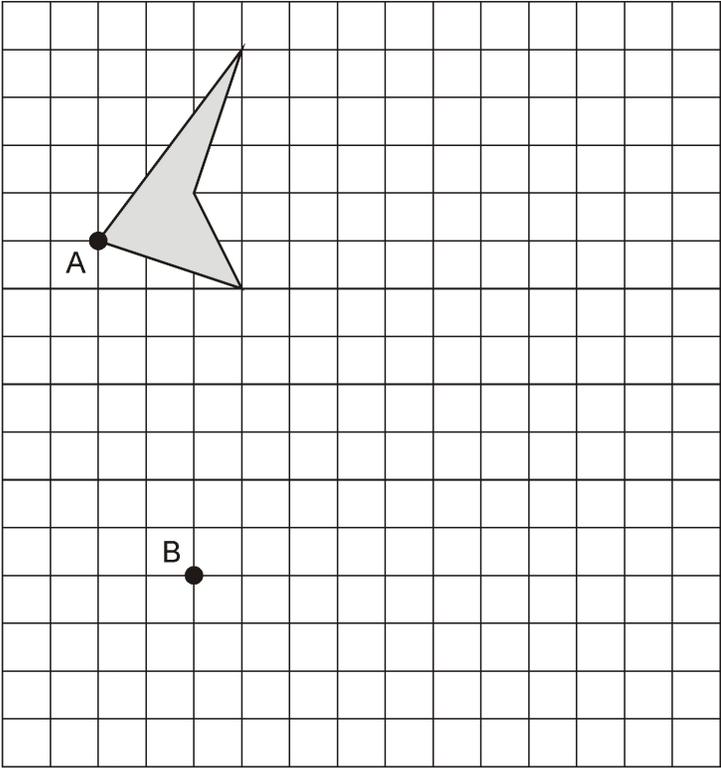
2 mark

4

The shaded shape is translated from **A** to **B** and **enlarged** by a **scale factor of 2**

Draw the **enlarged shape** on the grid.

Use a ruler.

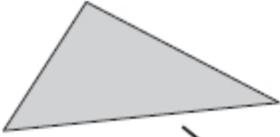


2 mark

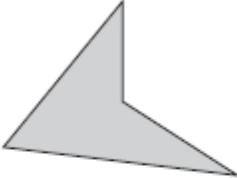
5

Match each shape to the correct name.

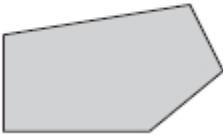
One has been done for you.



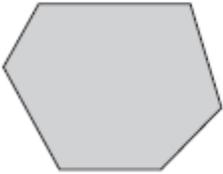
pentagon



triangle



octagon



quadrilateral

hexagon

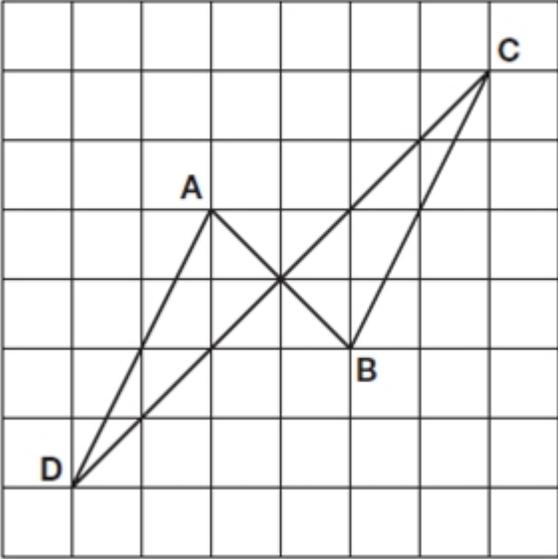


2 marks

6

The diagram shows four lines drawn on a square grid.

The lines are **AB**, **BC**, **CD** and **DA**.



Which two of the lines are **parallel**?
Circle them in the list below.

- AB
- BC
- CD
- DA

1 mark

Which two of the lines are **perpendicular**?
Circle them in the list below.

- AB
- BC
- CD
- DA

1 mark

7

This is a centimetre grid.

Draw **3 more lines** to make a **parallelogram** with an **area of 10 cm²**.

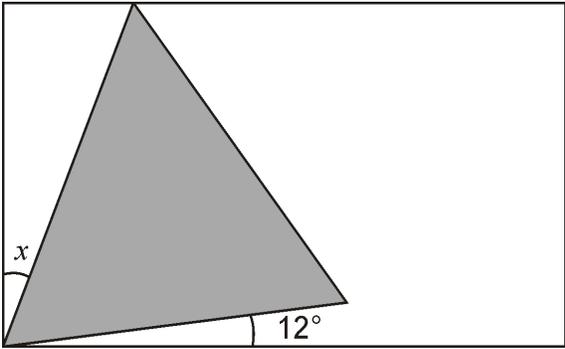
Use a ruler.



1 mark

8

Here is an **equilateral triangle** inside a **rectangle**.



Not to scale

Calculate the value of angle x .

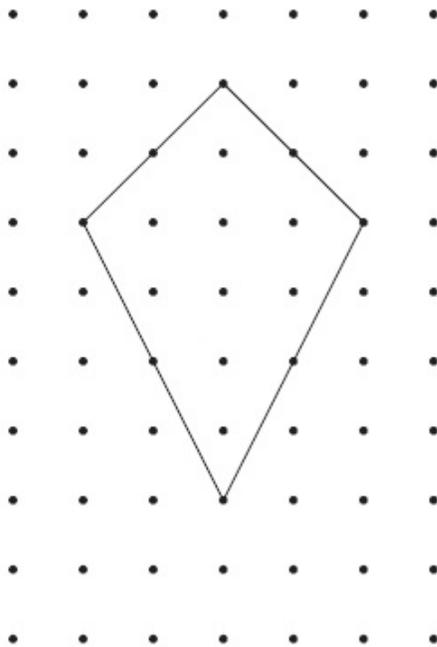
Do **not** use a protractor (angle measurer).

Show your method

2 marks

9

Here is a shape on a grid.



For each statement, put a tick (✓) if it is true.
Put a cross (✗) if it is not true.

The shape is a quadrilateral.

The shape has 2 lines of symmetry.

The shape is a parallelogram.

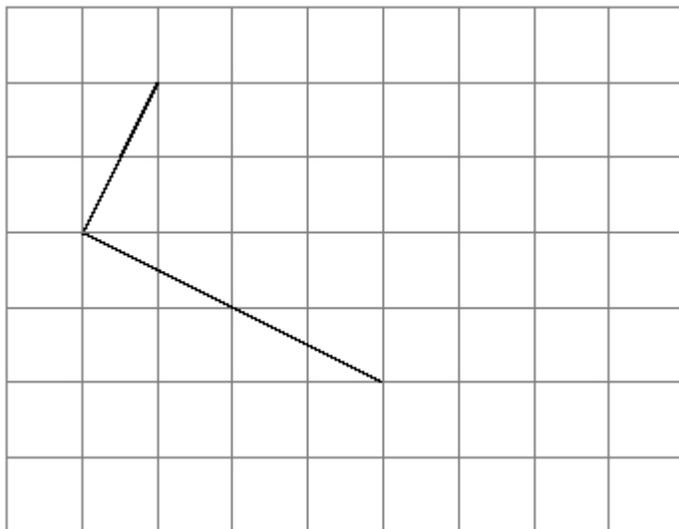
The shape has one right angle.

2 marks

10

Draw **two more straight lines** to make a rectangle.

Use a ruler.



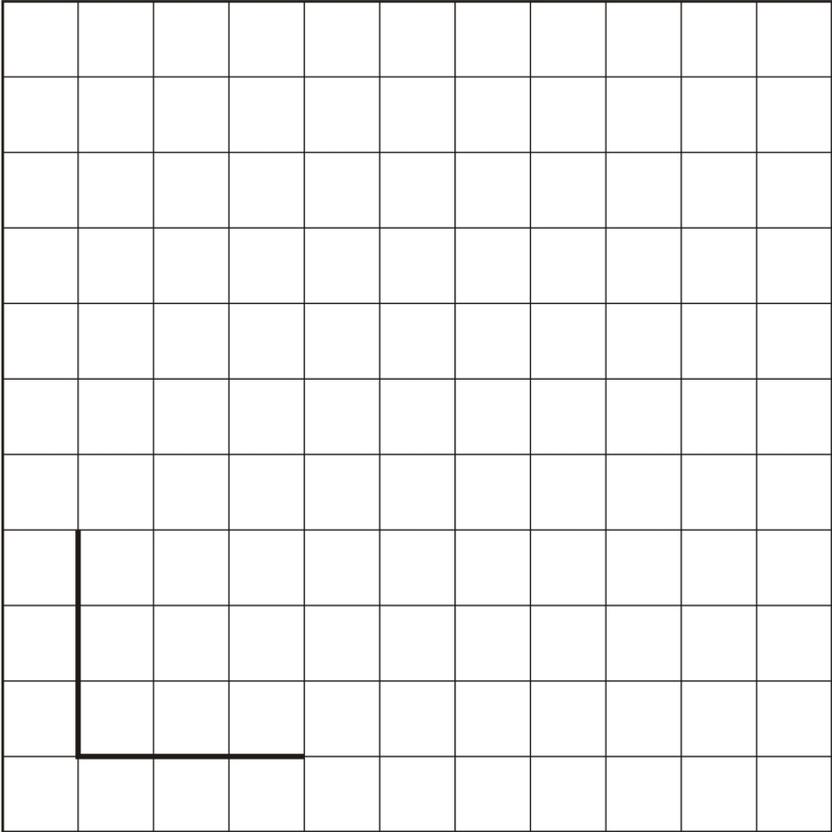
1 mark

11

Here is a centimetre grid.

Draw **two** more lines to make a **quadrilateral** with an area of **18 cm²**.

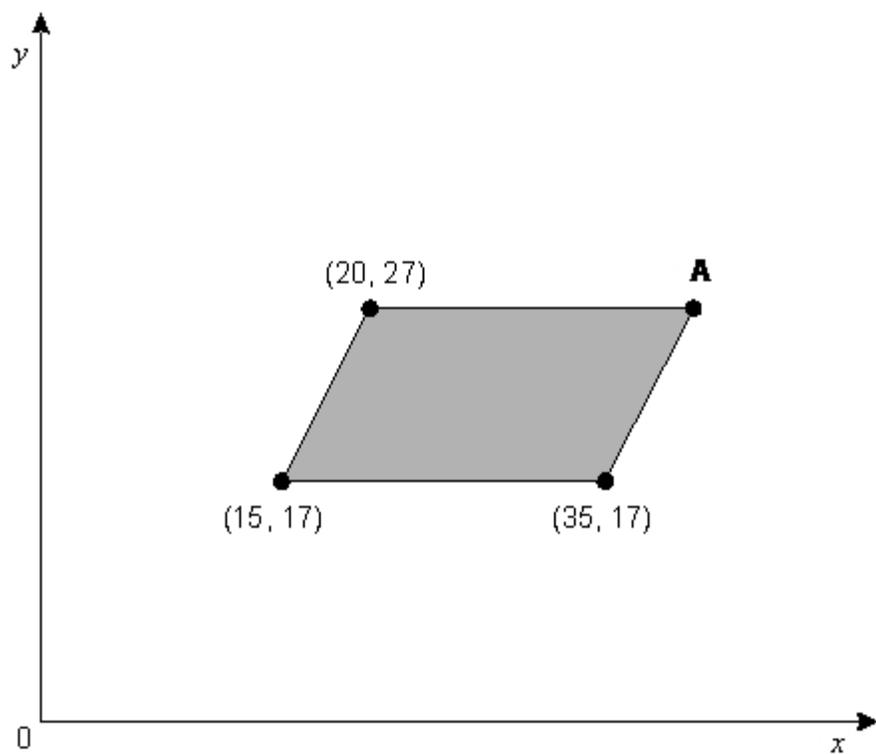
Use a ruler.



1 mark

12

The shaded shape is a parallelogram.



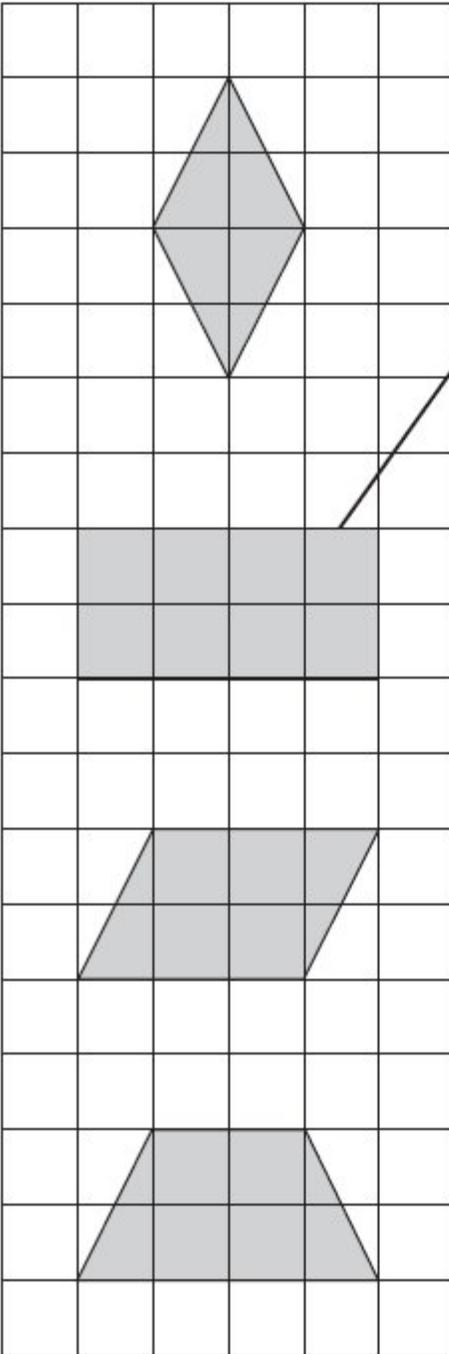
Write in the coordinates of point **A**.

1 mark

13

Match each quadrilateral to the correct description.

One has been done for you.



2 pairs of sides equal in length.
4 right angles.

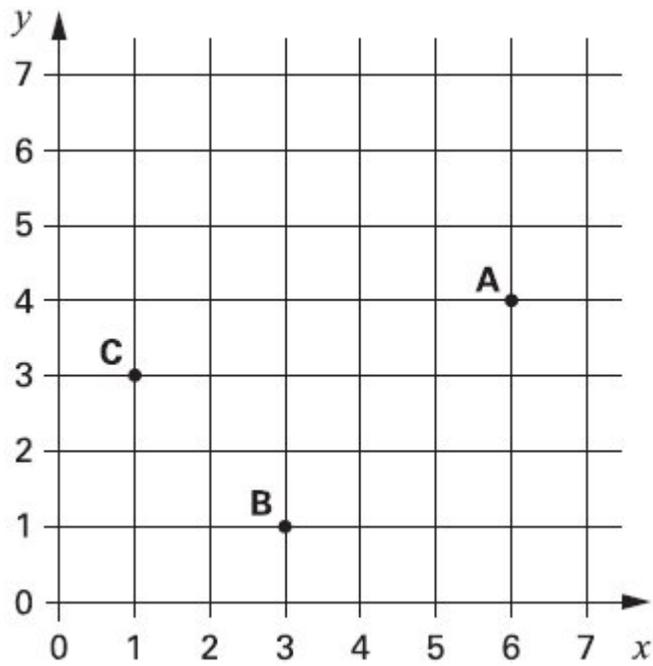
Only 1 pair of parallel sides.

Opposite sides are parallel.
It has no lines of symmetry.

4 sides of equal length.
Opposite angles are equal.

1 mark

14



A, B and C are three corners of a rectangle.

What are the coordinates of the fourth corner?

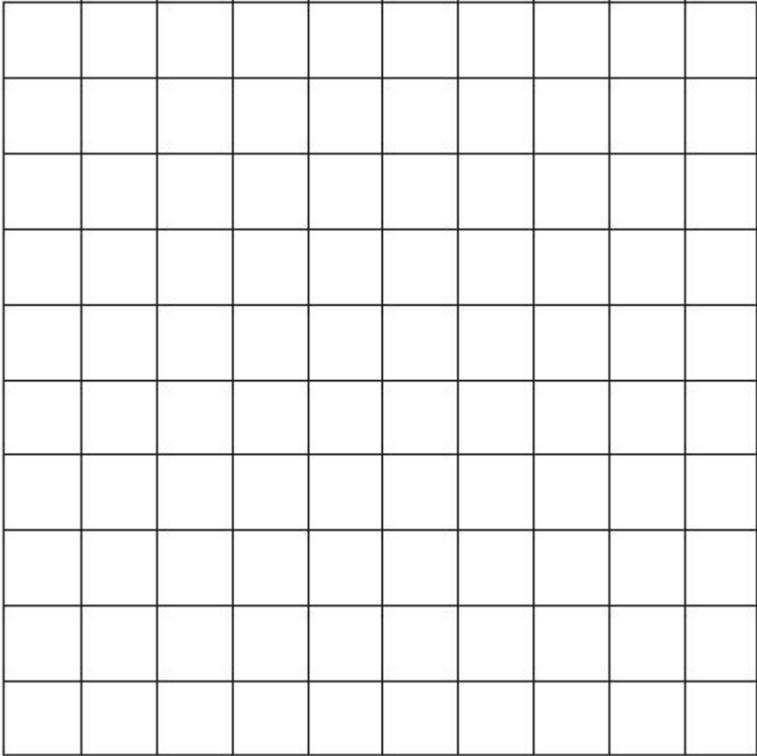
(,)

1 mark

15

Here is a centimetre grid.

Draw a **rectangle** whose **longer sides** are **6 cm**

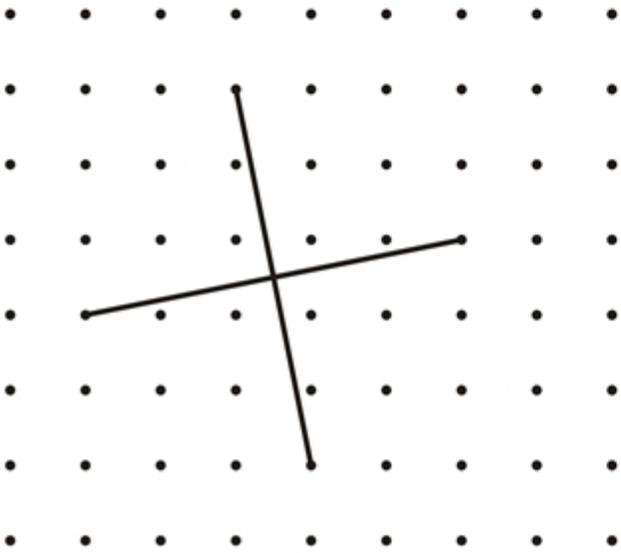
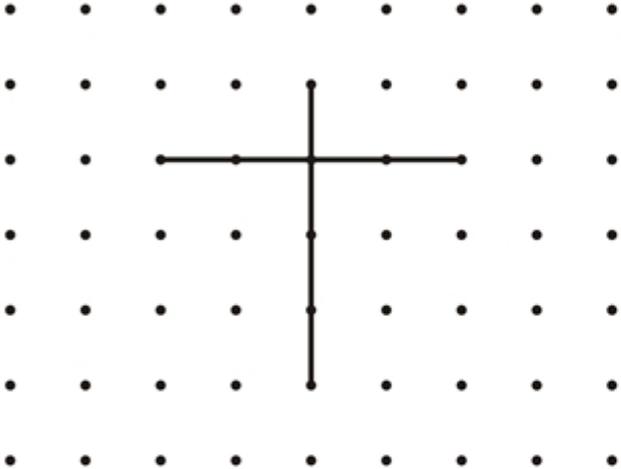
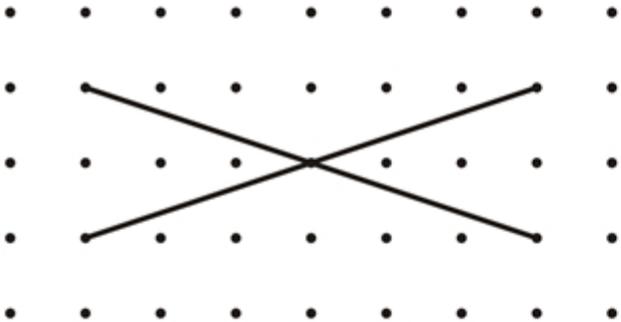


1 mark

16

These diagrams show the **diagonals** of three **quadrilaterals**.

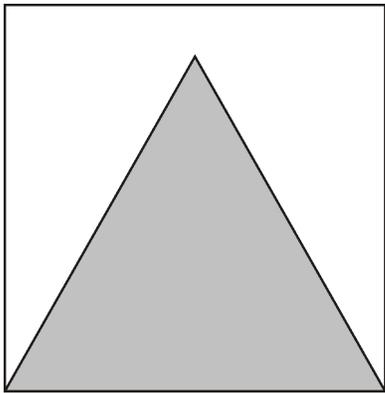
Write the names of the quadrilaterals in the boxes.



2 marks

17

Here is an equilateral triangle inside a square.



Not actual size

The perimeter of the triangle is 48 centimetres.

What is the perimeter of the **square**?

Show your method

cm

2 marks

18

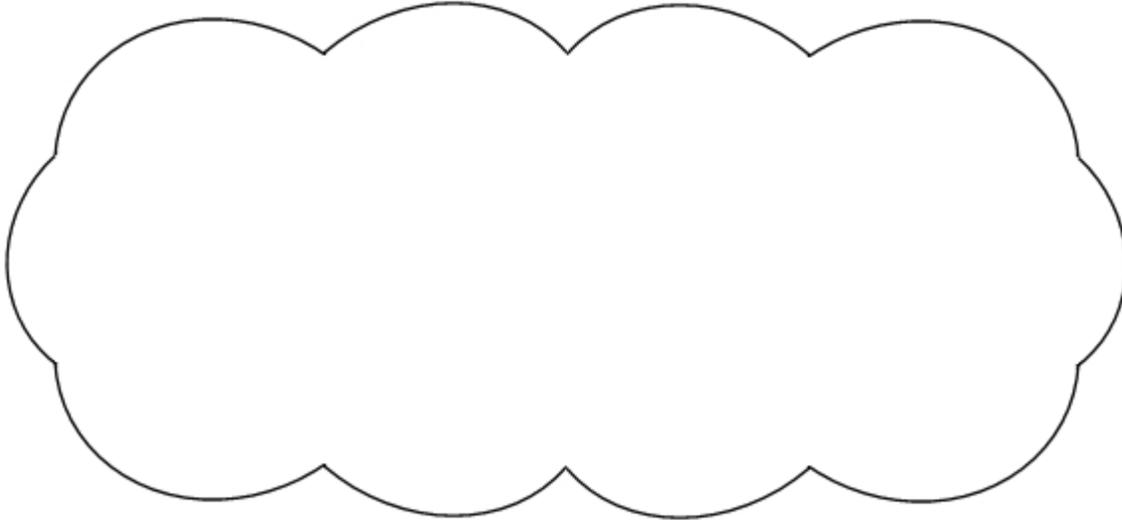
A square always has four sides.

Is it true that a four-sided shape is **always** a square?

Circle **Yes** or **No**.

Yes / No

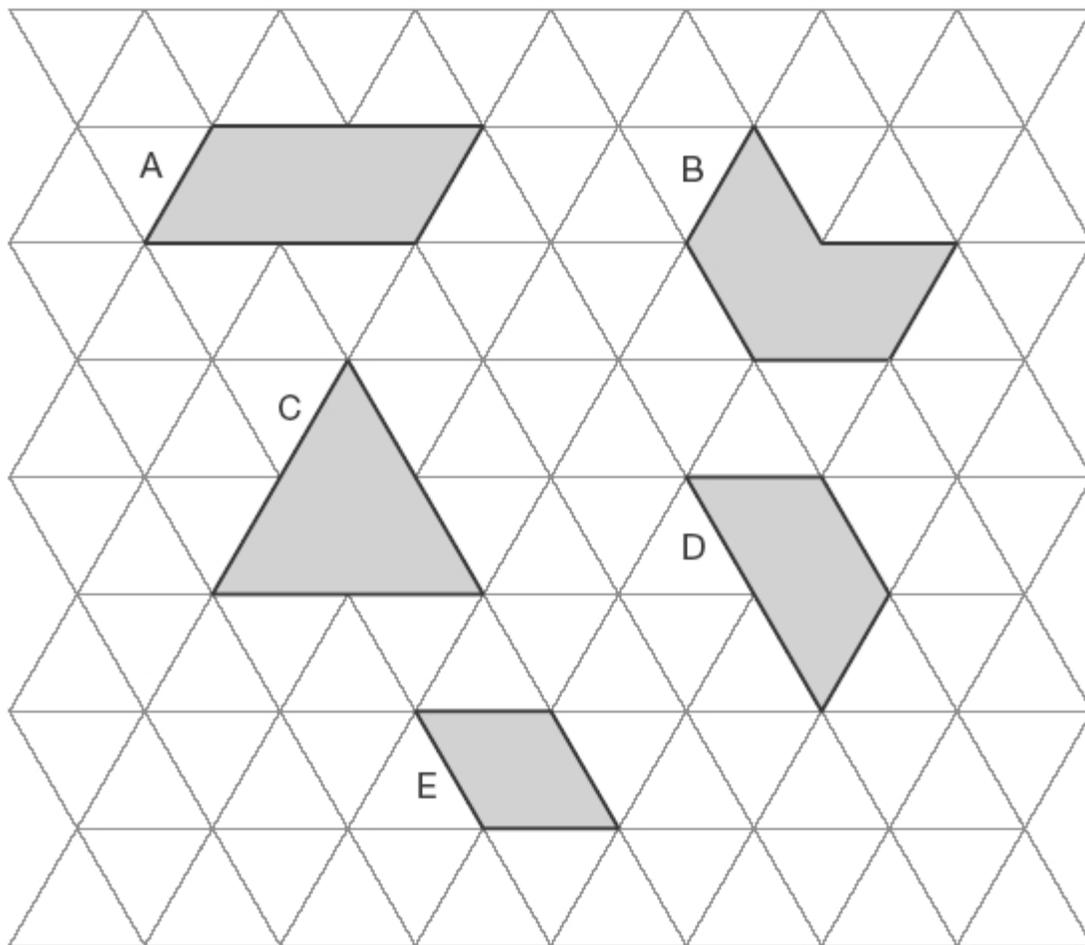
Explain how you know.



1 mark

19

Here are five shapes made from equilateral triangles.



Write the letter of the shape that is a **rhombus**.

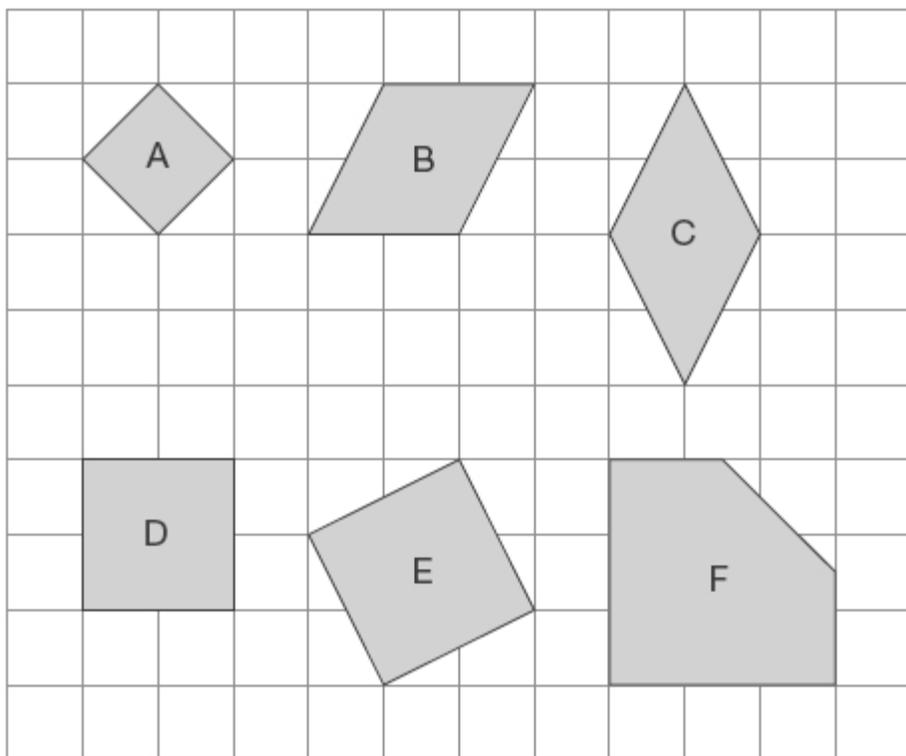
1 mark

Write the letter of the shape that has only **one** pair of parallel sides.

1 mark

20

Here are six shapes on a square grid.



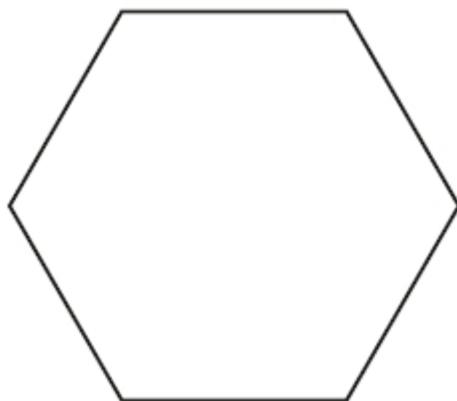
Write the letters of **all** the shapes that are squares.

1 mark

21

Here is a hexagon.

Draw **two** straight lines across the hexagon to make two triangles and two quadrilaterals.



1 mark

22

The following quadrilaterals all have a **perimeter of 36cm**.

Here is a table to show the length of each side.

Complete the table.

One quadrilateral is done for you.

	Side lengths			
square	9cm	9cm	9cm	9cm
rectangle	3cm			
rhombus	9cm			
kite	10cm			

2 marks

23

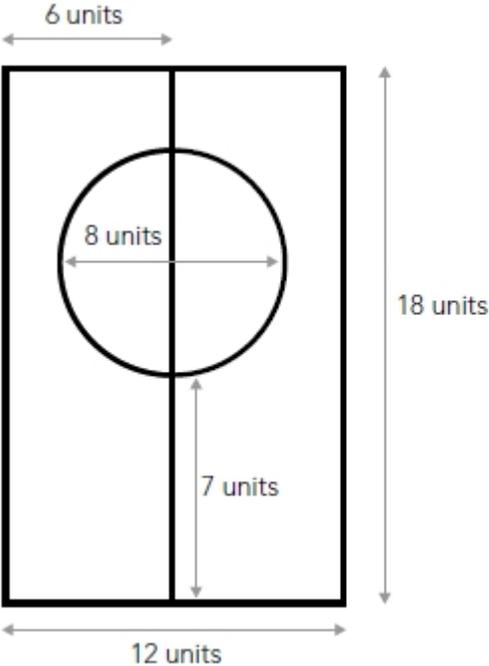
The flag of Greenland is a rectangle with a circle drawn inside.



Here is the same flag rotated.



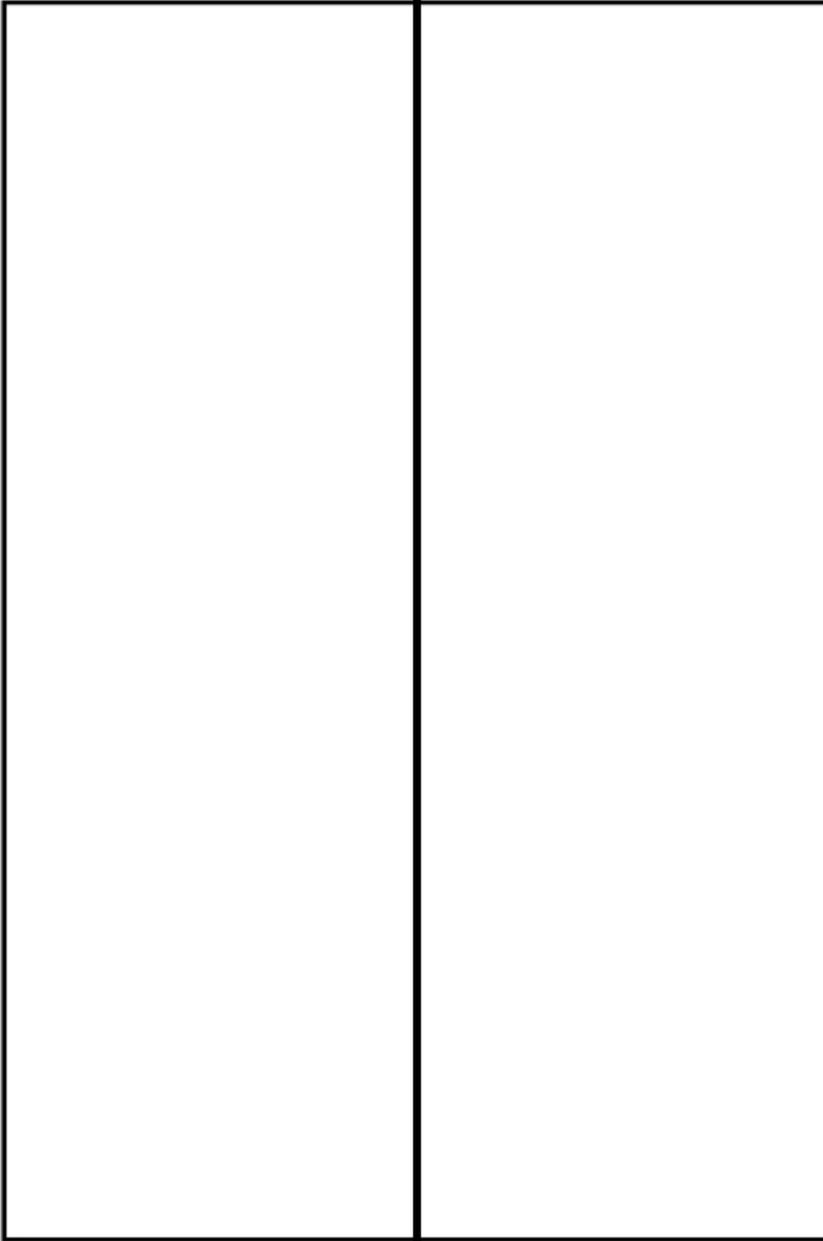
The sketch gives the information you need to draw the flag.



Not drawn accurately

Use the correct mathematical equipment to **draw accurately** the flag of Greenland.

Some of the flag is drawn for you.



3 marks

24

Join dots on the grid to make a quadrilateral that has **3 acute** angles.

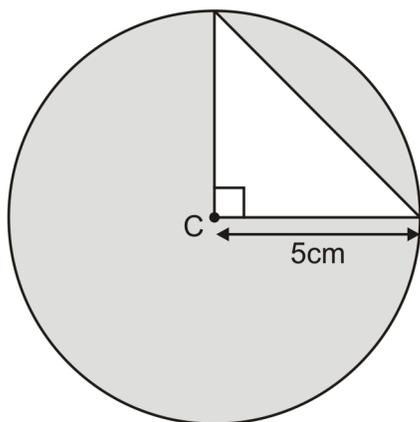


1 mark

25

The diagram shows a **right-angled triangle** inside a **circle**.

The circle has a radius of **5 centimetres**.

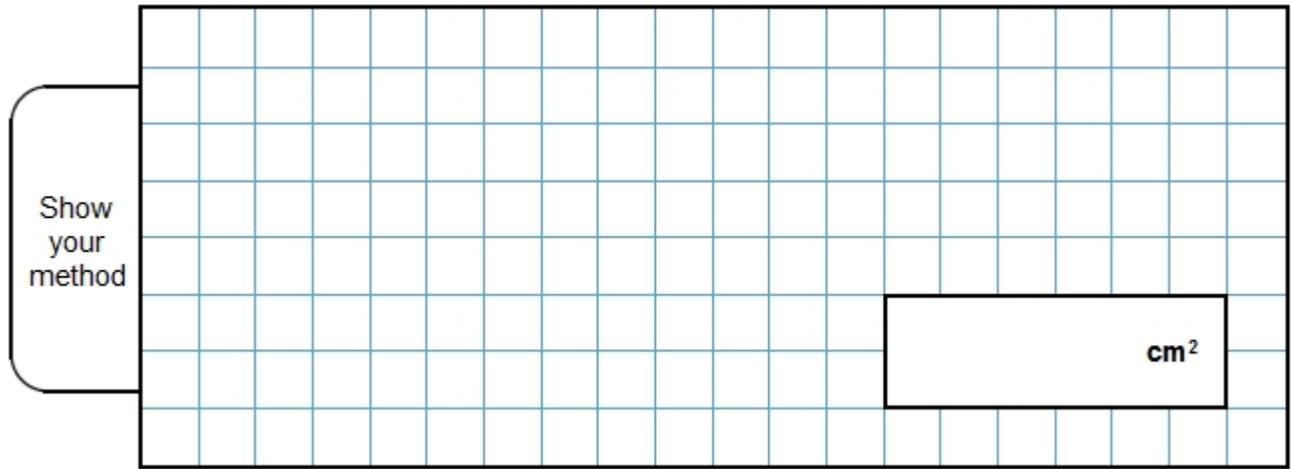


Calculate the **area** of the **triangle**.

cm^2

1 mark

Calculate the area of the **shaded part** of the diagram.



2 mark

Mark schemes

1 32 [1]

2 Award **TWO** marks for the correct answer of 14

If the answer is incorrect, award **ONE** mark for evidence of appropriate method, eg

$$17.5 \times 4 = 70$$

$$70 \div 5$$

*Accept for **ONE** mark 140 **OR** 1.4 as evidence of appropriate method.*

*Answer need not be obtained for the award of **ONE** mark.*

Up to 2 (U1)

[2]

3 (a) 289

1

(b) Award **TWO** marks for a correct answer of 205 **OR** a number calculated from the answer given in **(a)**, ie
(answer given in **(a)**) – 66

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, eg

$$196 - (4 \times 16.5)$$

OR

$$(\text{answer given in } \mathbf{(a)}) - (4 \times 16.5)$$

OR

$$14^2 + 3^2 = 196 + 9 \text{ (Pythagoras)}$$

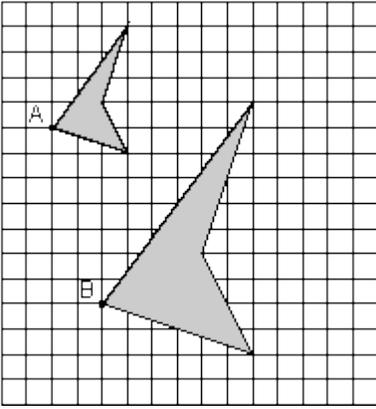
Calculation need not be completed for the award of the mark.

Up to 2

[3]

4

Award **TWO** marks for a correct drawing as shown below:



Shape need not be shaded.

Vertices must be within 2mm of the correct grid points.

If the answer is incorrect, award **ONE** mark for any two of the three plotted points correctly placed

OR a correctly enlarged shape drawn anywhere on the grid

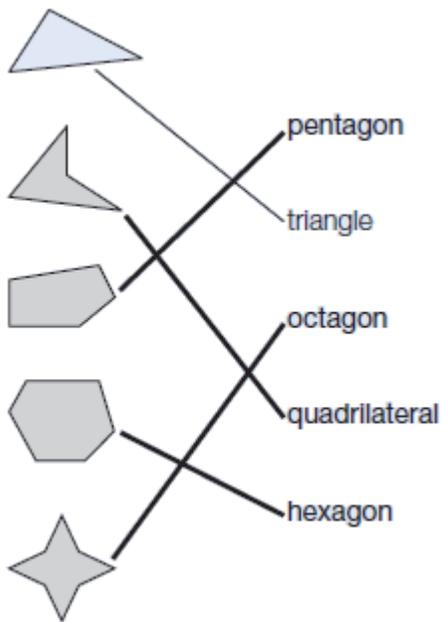
OR a shape showing a consistent error of one grid square in the location of the three plotted vertices, eg

all plotted vertices one square too far to the right.

Up to 2

[2]

5 Award **TWO** marks for four shapes correctly matched as shown:



If the answer is incorrect, award **ONE** mark for at least two shapes correctly matched.

Lines need not touch shapes or names, provided the intention is clear.

Do not credit any shape which has been matched to more than one name.

Up to 2

[2]

6 (a) AB BC CD DA

Accept alternative unambiguous indications of the correct lines.

1

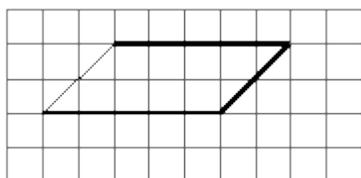
(b) AB BC CD DA

Accept alternative unambiguous indications of the correct lines.

1

[2]

7 Diagram completed as shown below:

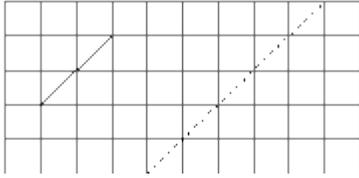


Accept slight inaccuracies in drawing provided the intention is clear.

The shape need not be shaded.

OR

any parallelogram using the given line,
and part of the broken line shown below.



[1]

8

Award **TWO** marks for the correct answer of 18°

Calculation need not be performed for the award of the mark.

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, eg $90 - 60 - 12$

Up to 2

[2]

9

Award **TWO** marks for all four boxes ticked or crossed correctly as shown:



If the answer is incorrect, award **ONE** mark for three boxes ticked or crossed correctly.

Accept alternative unambiguous indications eg Y or N.

*For **TWO** marks accept:*

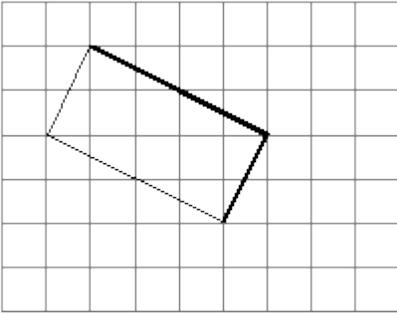


Up to 2m

[2]

10

Completion of rectangle as shown:

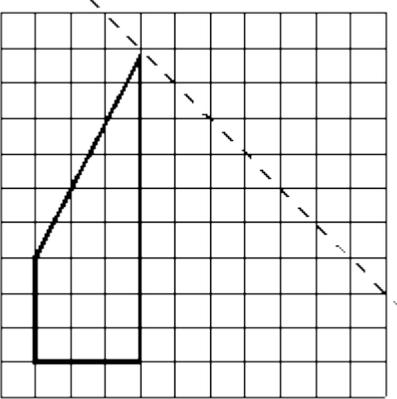


Accept slight inaccuracies in drawing provided the intention is clear.

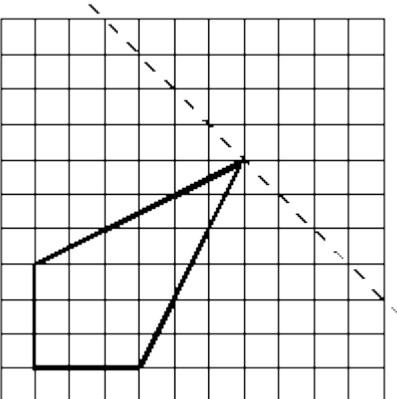
[1]

11

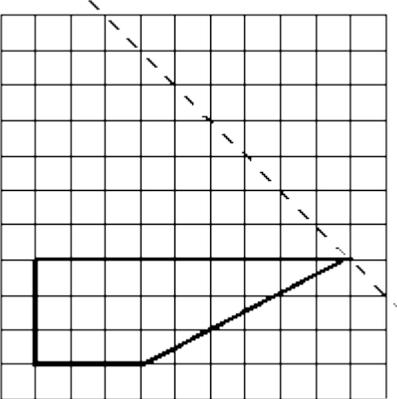
Two more lines drawn which intersect at a fourth vertex located anywhere on the dotted line shown on the diagrams below, eg



OR



OR



Accept slight inaccuracies in drawing provided the intention is clear.

[1]

12

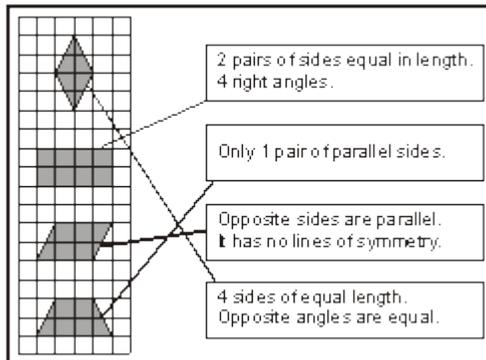
(40, 27)

*Coordinates must be written in the correct order.
Accept unambiguous answers written on the diagram.*

[1]

13

Three lines drawn as shown:



***All three** lines must be drawn correctly for the award of the mark.
Lines do not have to touch the boxes or shapes exactly, provided
the intention is clear.*

[1]

14

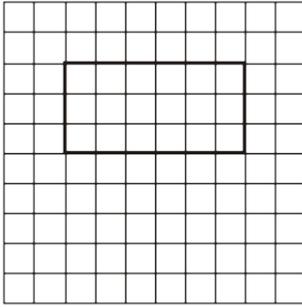
(4, 6)

***Both** numbers must be correct for the award of the mark.
Accept correct answers written on the diagram with or without
brackets.
Coordinates must be written in the correct order.*

[1]

15

Any rectangle drawn on the grid whose longer sides are 6 cm, eg



Accept slight inaccuracies in drawing, provided the intention is clear.

Do not accept a 6 cm square.

[1]

16

Award **TWO** marks for all three shape names written in the correct order as shown:

- rectangle
- kite
- square

If the answer is incorrect, award **ONE** mark for two shape names written in the correct order.

Accept recognisable misspellings.

For the first shape, accept oblong or parallelogram.

*For the third shape, accept rhombus or parallelogram but **do not** accept diamond.*

Up to 2

[2]

17

Award **TWO** marks for the correct answer of 64

If the answer is incorrect, award **ONE** mark for evidence of appropriate working, eg

$$48 \div 3 = 16$$

$$16 \div 4 = \text{wrong answer}$$

*Calculation must be performed for the award of **ONE** mark.*

Up to 2 (U1)

[2]

18

An explanation which recognises that a quadrilateral must have particular properties to be a square, eg:

- 'It can only be a square if all the angles are right angles'
- 'It can only be a square if all the sides are equal'

OR

an explanation (or diagram) which recognises that there are quadrilaterals other than squares, eg:

- 'It could be a rectangle'
- 'A rhombus has four sides'
- 'It could be a kite or a trapezium or a parallelogram'
- 'It could be an oblong'
- 'The sides could be unequal'
- 'The angles might be different'
-



No mark is awarded for circling 'No' alone.

Do not accept vague or incomplete explanations, eg:

- 'It might not be a square'
- 'Not all four-sided shapes are squares'
- 'A four-sided shape is a quadrilateral'
- 'It could be a diamond'.

If 'Yes' is circled but a correct, unambiguous explanation is given, then award the mark.

U1

[1]

19

(a) E

1

(b) D

1

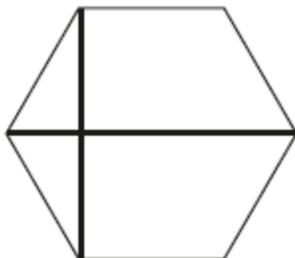
[2]

20 A AND D AND E

Letters may be given in any order.

[1]

21 Diagram completed as shown:



OR



Accept slight inaccuracies in drawing, provided the intention is clear.

Diagrams may be completed in any orientation.

U1

[1]

22 Completes all three rows correctly, eg:

- | | | | | |
|-----------|------|------|------|------|
| rectangle | 3cm | 3cm | 15cm | 15cm |
| rhombus | 9cm | 9cm | 9cm | 9cm |
| kite | 10cm | 10cm | 8cm | 8cm |

! Measures

Accept Side lengths in each row may be given in any order

Accept correct values with cm omitted eg, for the rectangle:

- 15 3 15

2

or

Completes two rows correctly

1

[2]

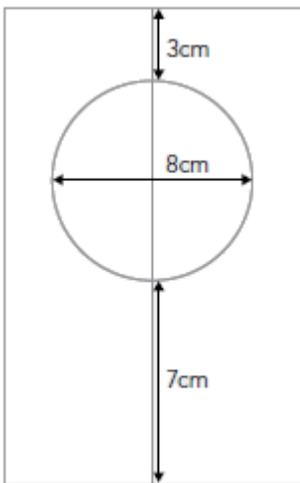
23

Completes the drawing according to the following conditions, with a tolerance of 3 mm in each case

the circle has a diameter of 8 cm

the highest point at which the circle crosses the central vertical line is 3 cm from the top of the answer box

the lowest point at which the circle crosses the central vertical line is 7 cm from the bottom of the answer box



3

or

Any two of the three conditions given above are correct

2

or

Any one of the three conditions given above is correct

1

Accept flag constructed 'upside down'

! Shading incorrect or omitted, or additional lines drawn

Condone, provided the response is unambiguous

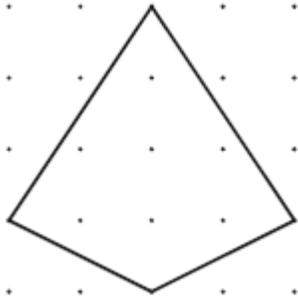
! Compasses not used

For pupils who meet one or more of the conditions without using compasses, deduct ONE mark

[3]

24

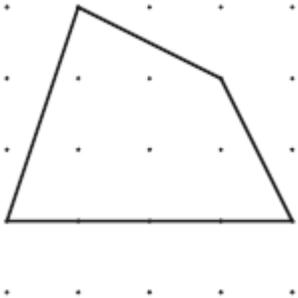
A quadrilateral with three acute angles, e.g.



OR



OR



Accept inaccurate drawing provided the intention is clear.

[1]

25

(a) 12.5 OR $12\frac{1}{2}$

1

(b) Award **TWO** marks for the correct answer in the range of 66 to 66.1 inclusive **OR** an answer based upon values obtained in **13a**.

If the answer is incorrect award **ONE** mark for evidence of an appropriate method, eg

- $(3.14 \times 5 \times 5) - 12.5$

The calculation need not be completed for the award of the mark.

Up to 2

[3]