testbase

Weeks 13, 14 and 15

Angles

Name: _____

Class: _____

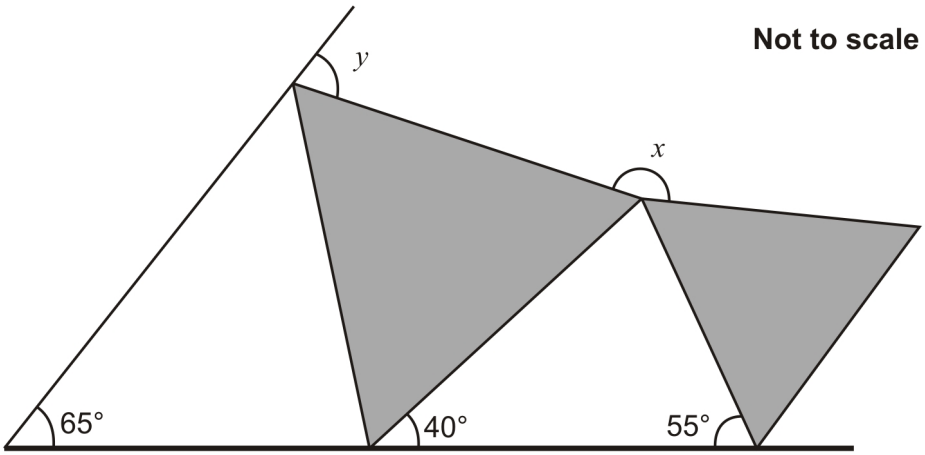
Date: _____

Time: **73 minutes**

Marks: **73 marks**

Comments:

1 The diagram shows two shaded **equilateral triangles**.



Calculate the size of the **angle x°** and **angle y**

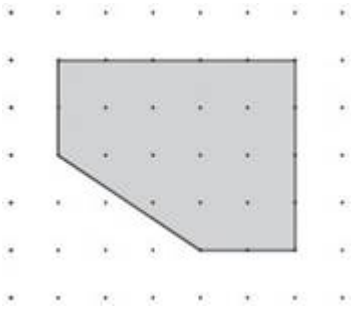
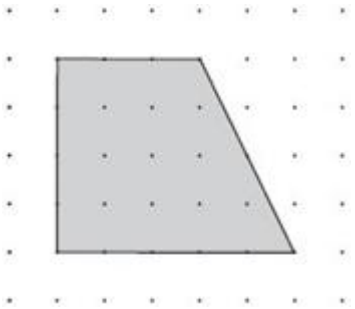
Do **not** use a protractor (angle measurer).

x = °

y = °

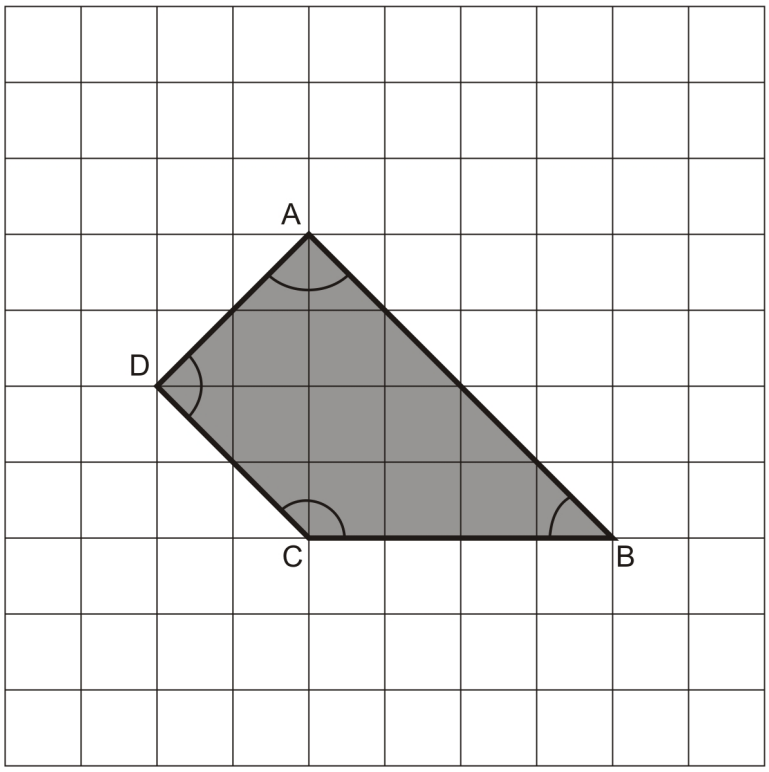
2 mark

2 Complete the table.

shape	number of **right** angles
	
	

1 mark

3 Here is a shape on a square grid.



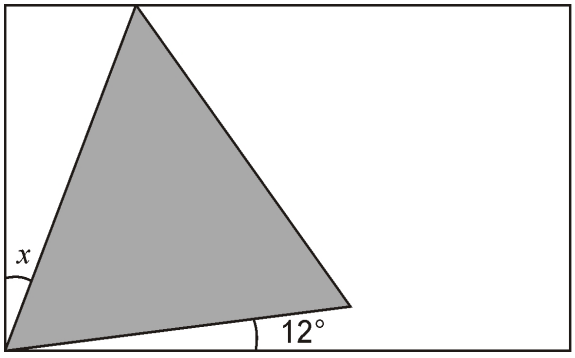
For each sentence, put a tick (✓) if it is true.

Put a cross (✗) if it is not true.

Angle **C** is an **obtuse** angle.	☐
Angle **D** is an **acute** angle.	☐
Line **AD** is **parallel** to line **BC**.	☐
Line **AB** is **perpendicular** to line **AD**.	☐

2 mark

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



Not to scale

Calculate the value of angle x.

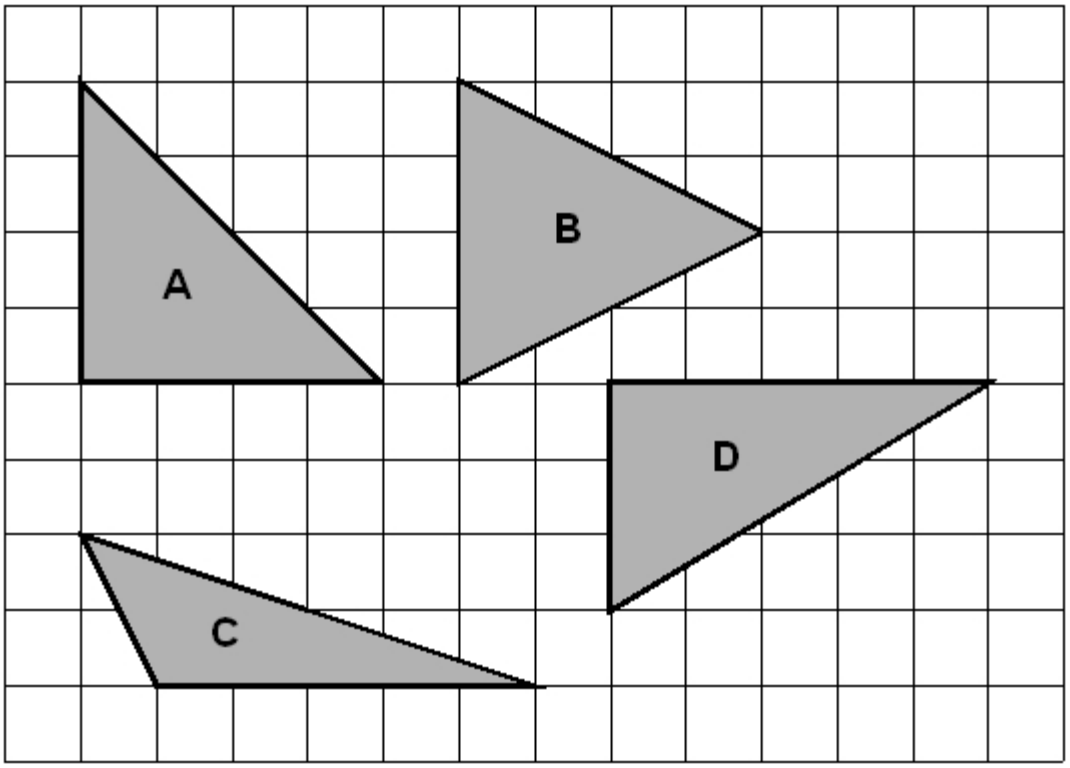
Do **not** use a protractor (angle measurer).

Show your method

°

2 marks

5 Here are four triangles drawn on a square grid.



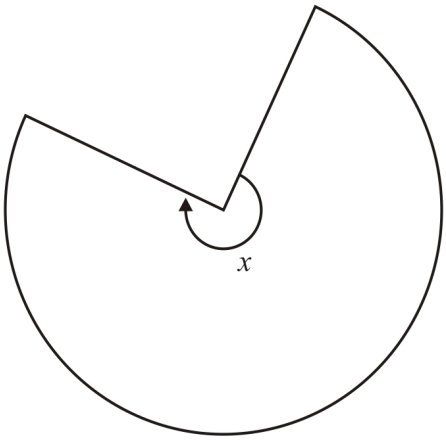
Write the letter for each triangle in the correct region of the sorting diagram.

One has been done for you.

	has a **right** angle	has an **obtuse** angle	has 3 **acute** angles
is isosceles	**A**		
is **not** isosceles			

2 marks

6 This shape is **three-quarters of a circle**.



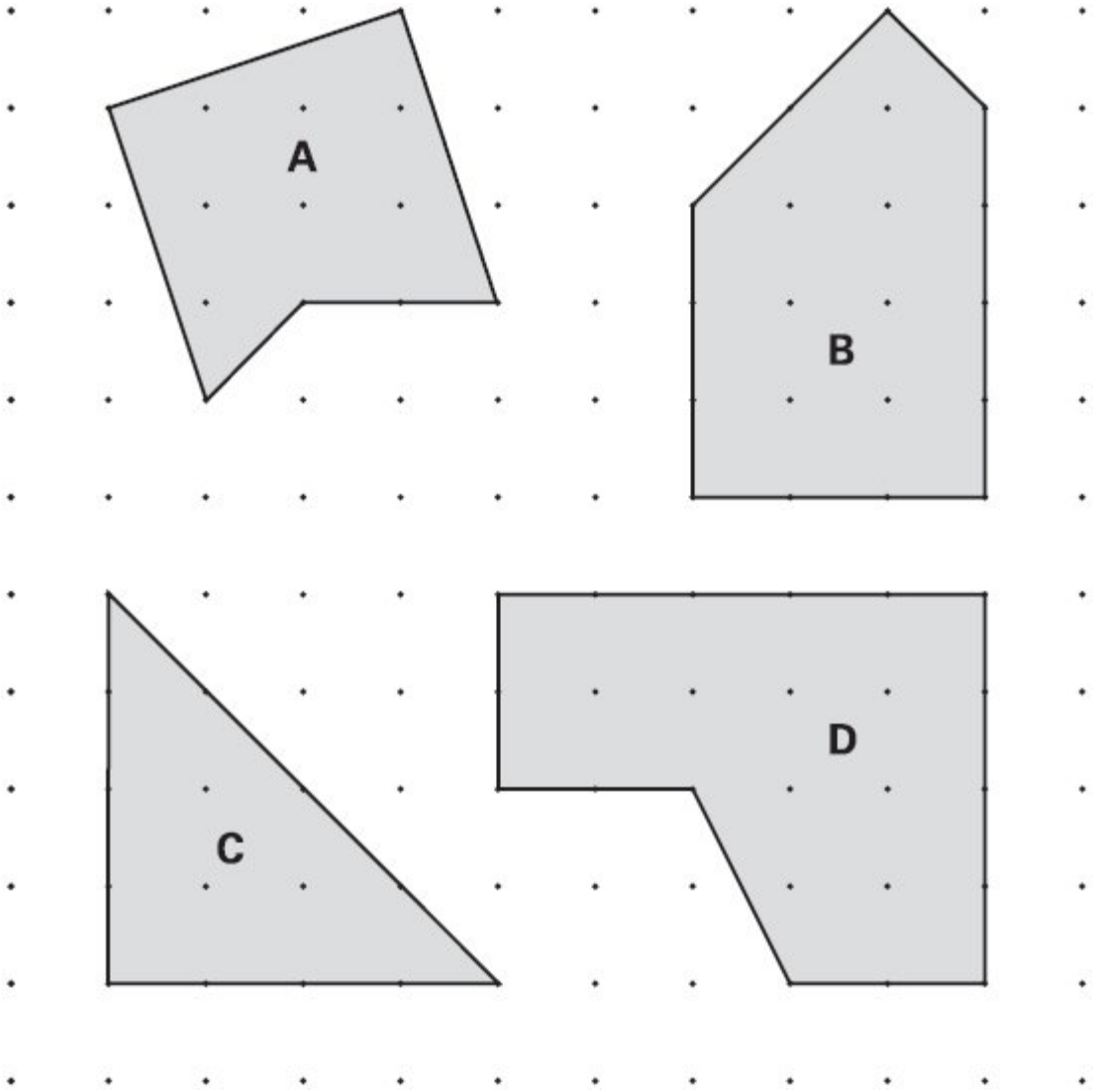
How many degrees is **angle x**?

°

1 mark

7 Here are four shapes.

They each have a different number of right angles.



Write the letter for each shape in the correct order.

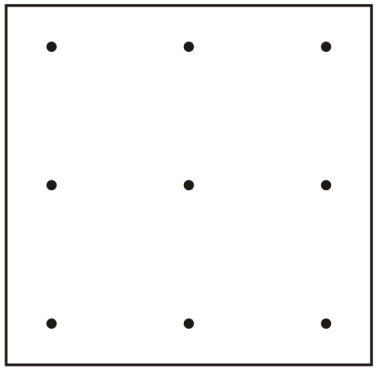
One has been done for you.

fewest right angles			most right angles
C			

1 mark

8 On the grid join dots to make a triangle which does **not** have a **right angle**.

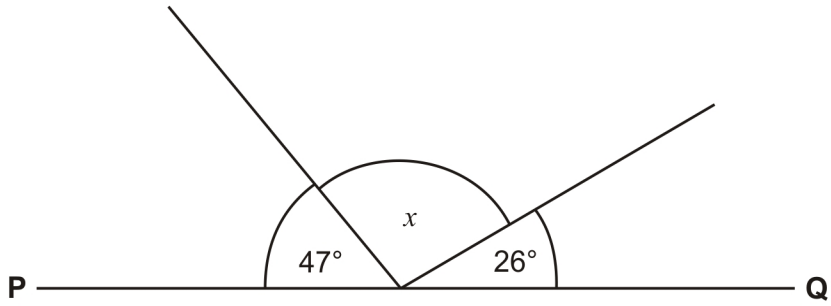
Use a ruler.



1 mark

9 **PQ** is a straight line.

Not drawn accurately

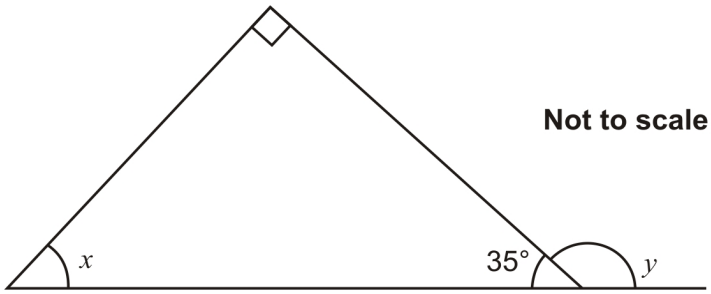


Calculate the size of angle x.

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

1 mark

10 Look at this diagram.



Calculate the size of angle ***x*** and angle ***y***.

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

x = °

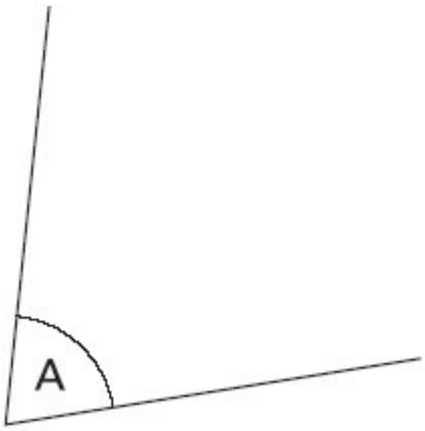
1 mark

y = °

1 mark

11 Measure **angle A** accurately.

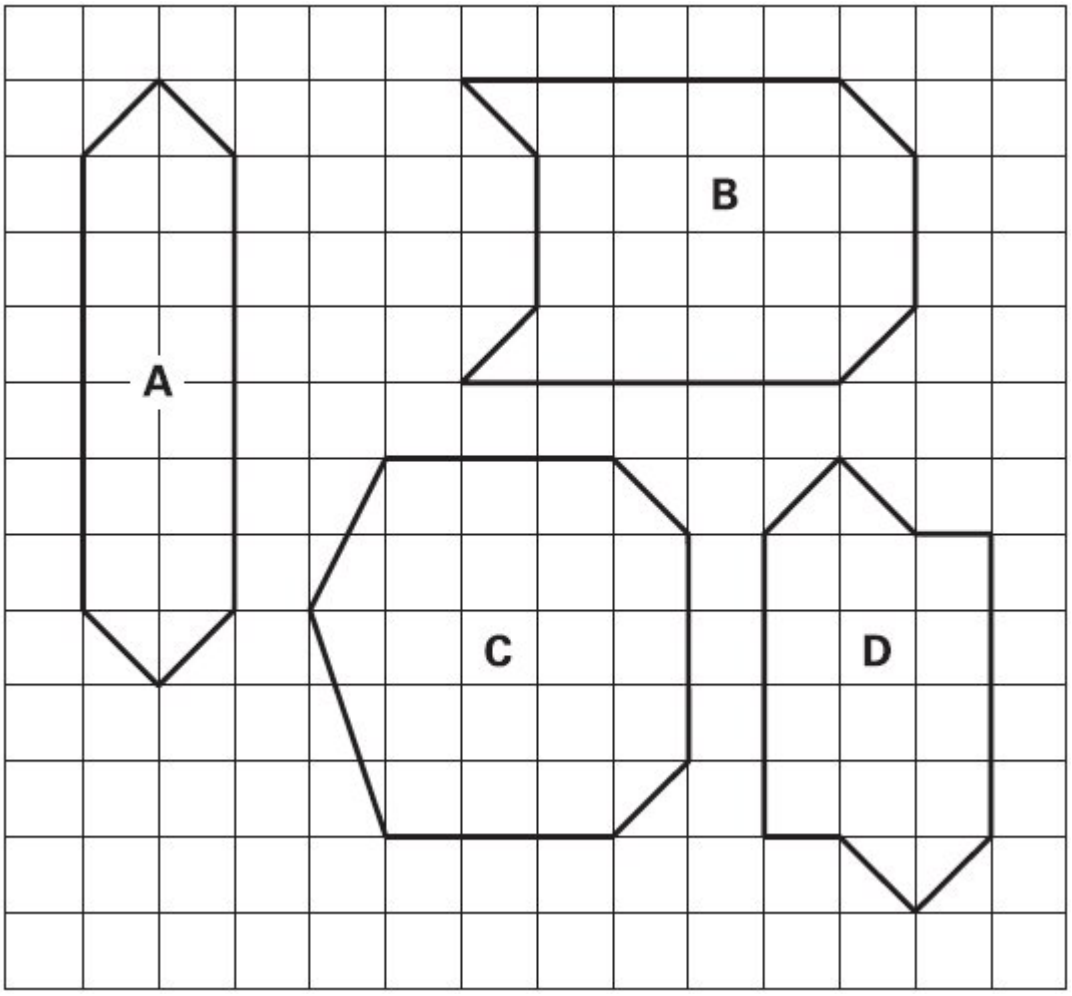
Use a protractor (angle measurer).



angle A °

1 mark

12 Here are four shapes on a square grid.

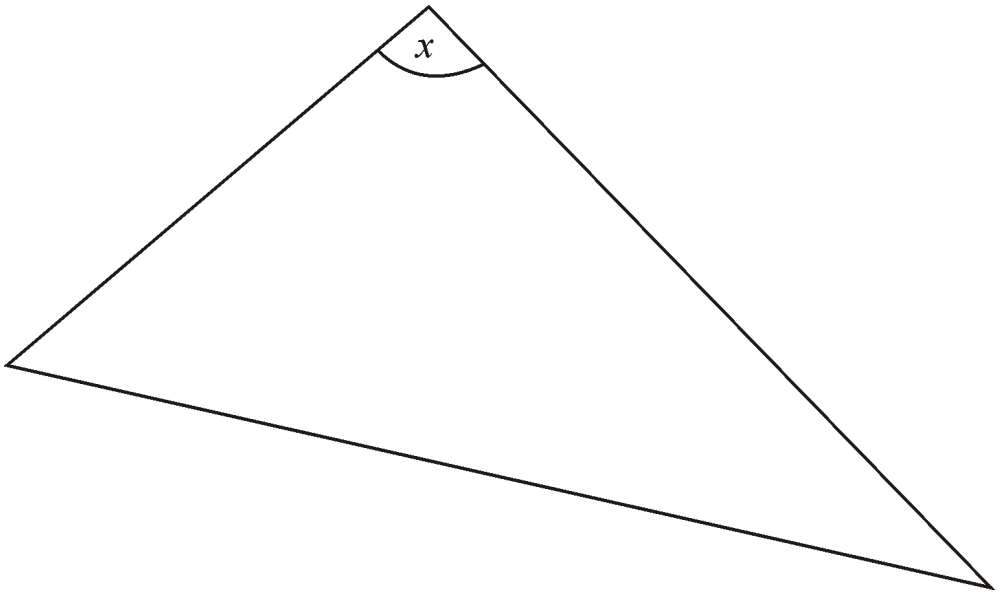


Complete the table.

	property of shape	
	is an octagon	has at least 1 right angle
shape **A**	✗	✓
shape **B**	✓	✗
shape **C**		
shape **D**		✓

1 mark

13



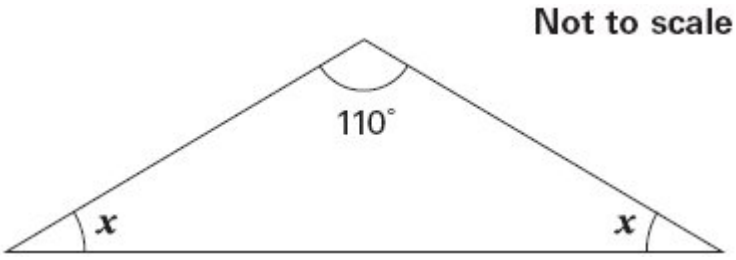
Measure angle x accurately.

Use a protractor (angle measurer).

$\square$ °

1 mark

14 Here is an isosceles triangle.



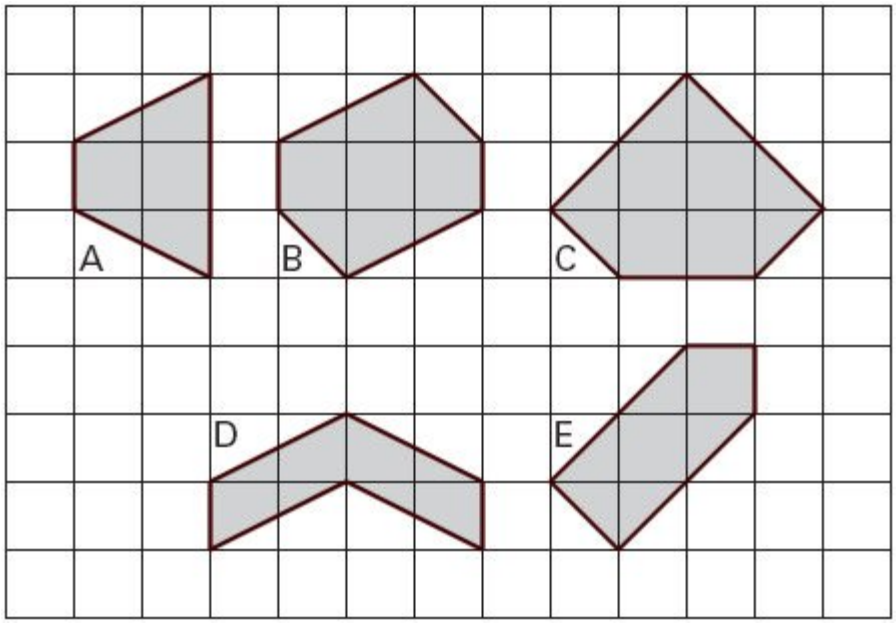
Calculate the size of angle x.

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

$\square$ °

1 mark

15 Here are some shaded shapes on a square grid.



Write the letters of the **two** shapes which are hexagons.

☐ and ☐

1 mark

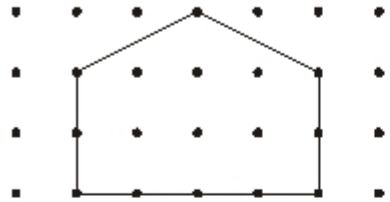
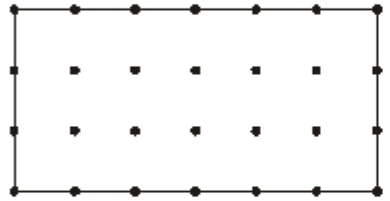
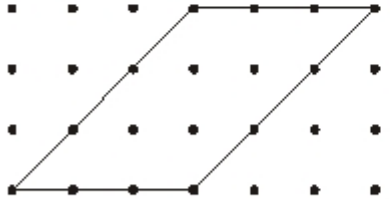
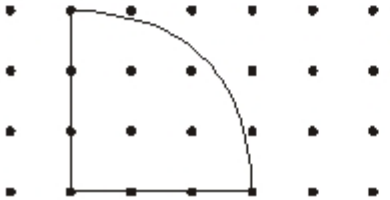
Write the letters of the **two** shapes which have **right angles.**

☐ and ☐

1 mark

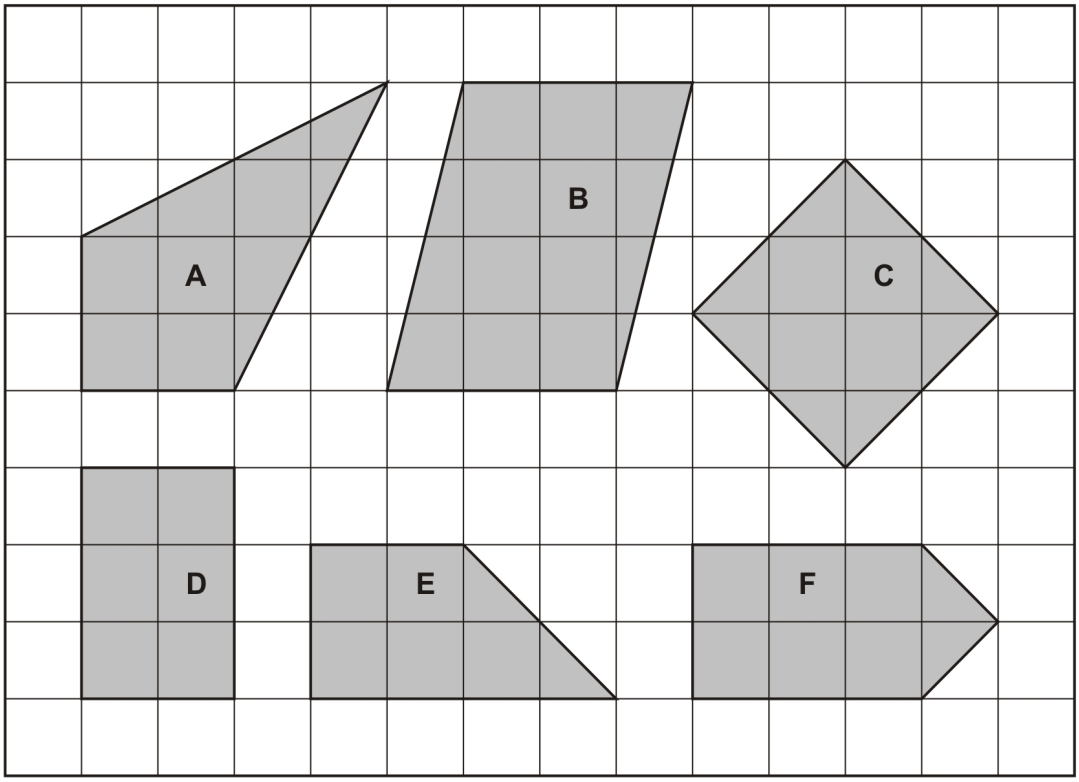
16 Put ticks (✓) and crosses (✗) on the chart to complete it correctly.

One has been done for you.

Shape	It is a quadrilateral	It has one or more right angles
	✗	✓
		
		
		

2 marks

17 Look at these shapes.



Complete the sentences below.

One has been done for you.

_____**A**_____ is a kite

_____ is not a quadrilateral

_____ has only 2 right angles

_____ has 2 acute angles

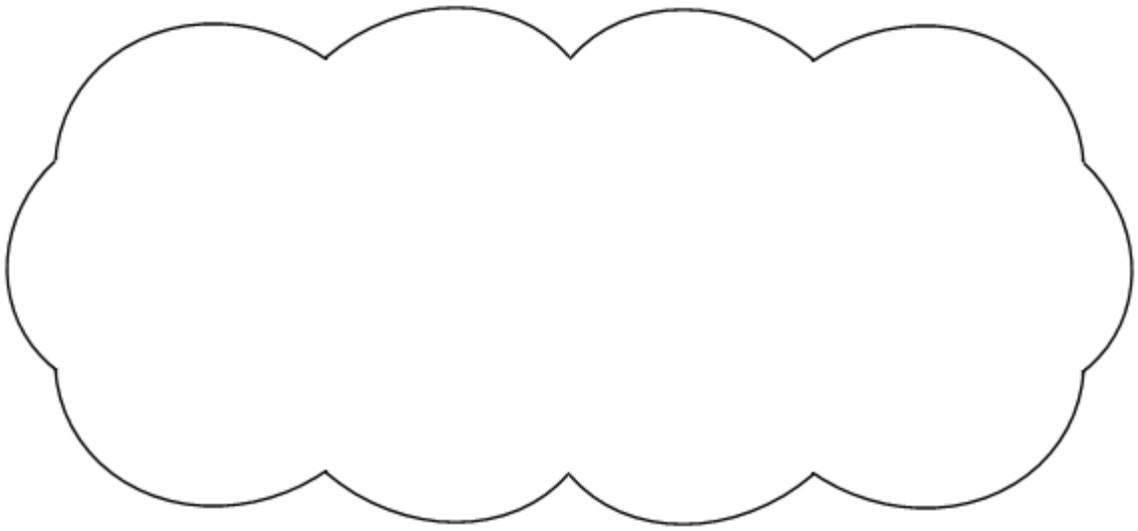
2 marks

18 Jamie draws a triangle.

He says,

'Two of the three angles in my triangle are obtuse'.

Explain why Jamie **cannot** be correct.

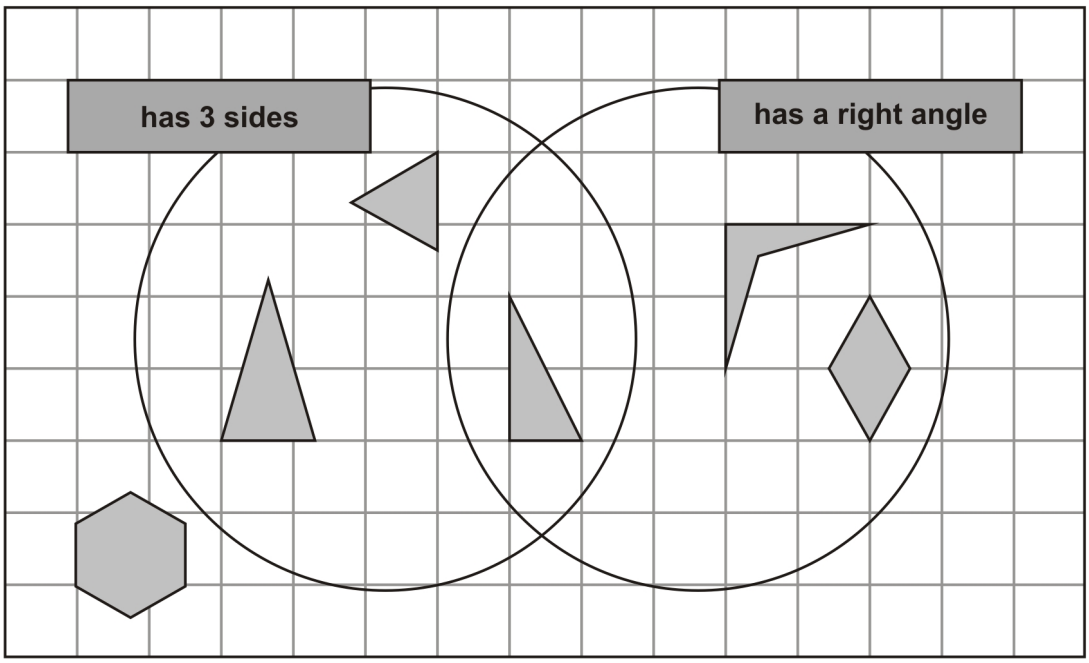


1 mark

19 Here is a diagram for sorting shapes.

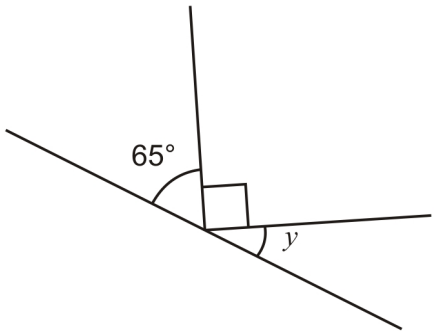
One of the shapes is in the wrong place.

Put a cross (✗) on it.



1 mark

20



Not to scale

Calculate the size of angle y in this diagram.

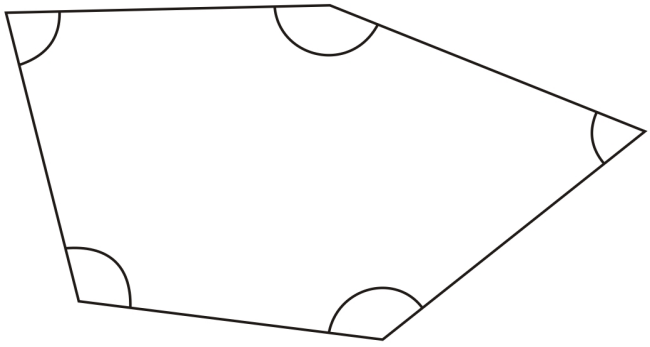
Do **not** use a protractor (angle measurer).

1 mark

21

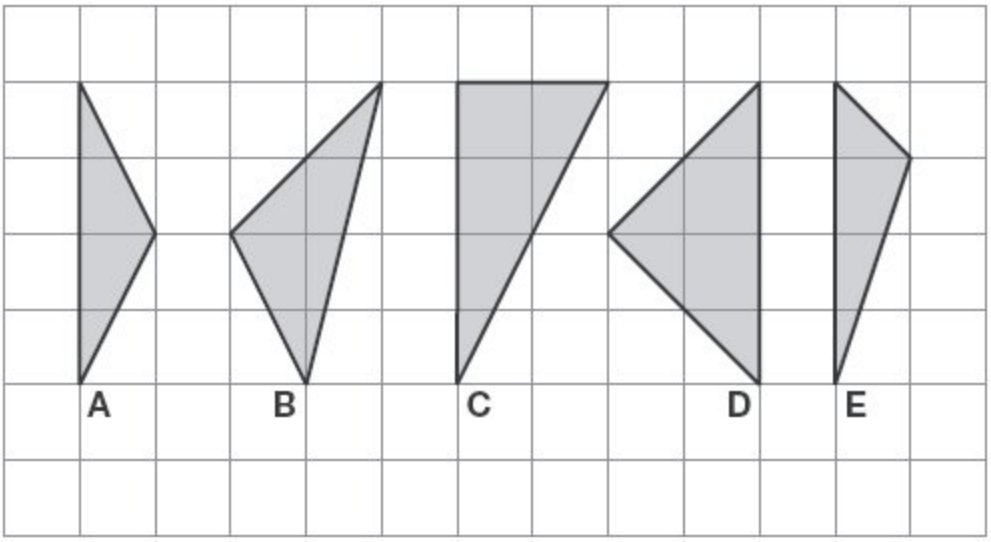
Look at this shape.

Tick (✓) each angle that is **less** than a right angle.



1 mark

22 Here are five shaded triangles on a square grid.



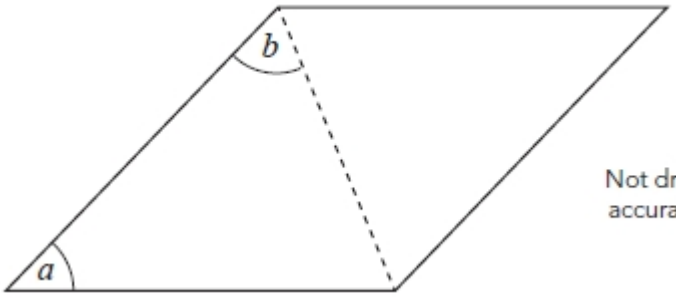
Write the letter of each triangle that has a **right angle**.

1 mark

Write the letter of each triangle that has **two equal sides**.

1 mark

23 The dotted line is a diagonal of this **rhombus**.



Not drawn accurately

If angle $a = 80°$, what is angle b?

°

Show your method

If angle $b = 80°$, what is angle a?

°

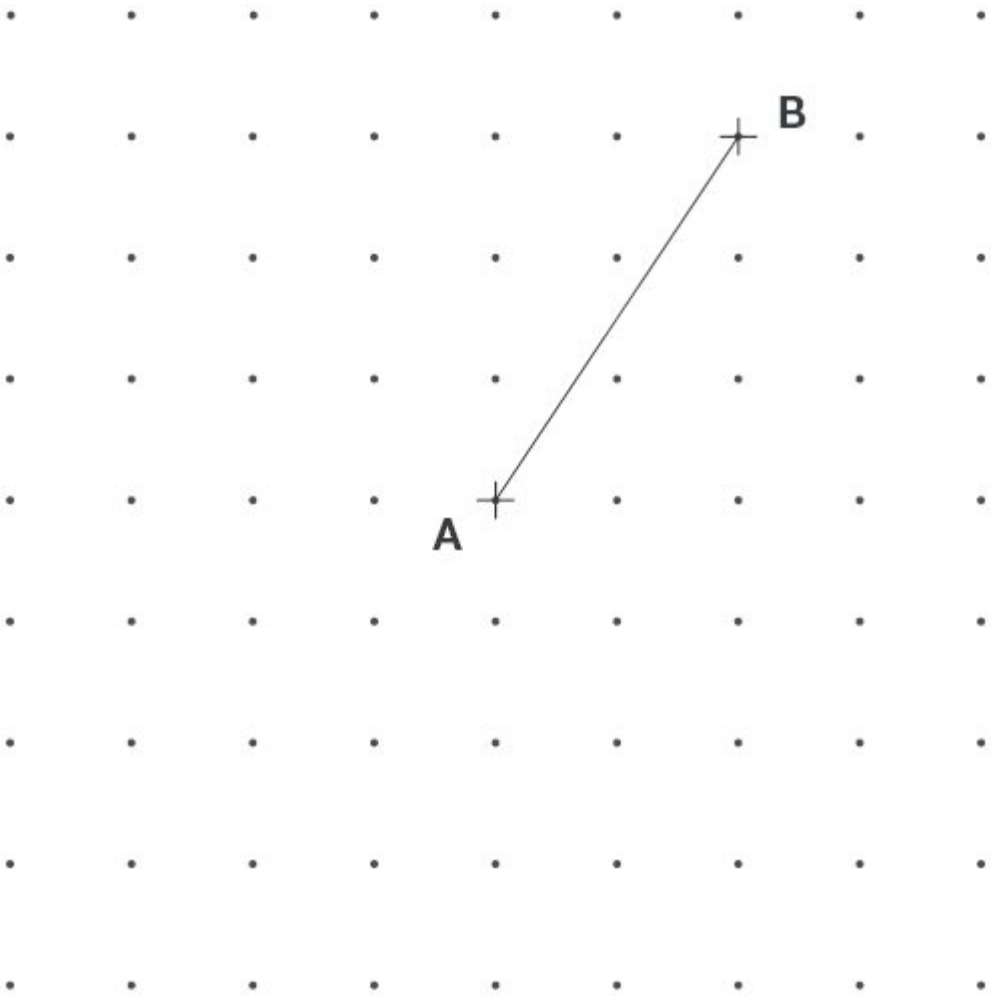
3 marks

24 Here is a grid of dots.

Point **A** and point **B** are joined by a straight line.

Draw a line to join point A to another dot on the grid so that the two lines make a right angle.

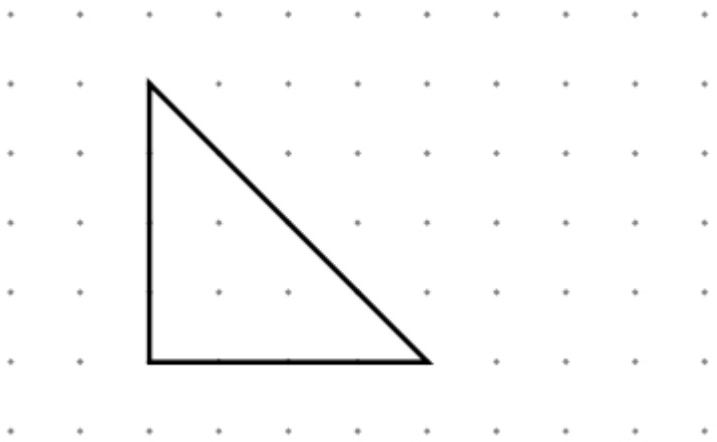
Use a ruler.



1 mark

25 Here is a triangle.

Two of its sides are 4 cm and **two** of its angles are 45°



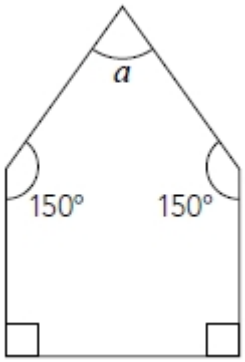
Join dots to make a different triangle.

Make **only one** of its sides 4 cm and **only one** of its angles 45°

1 mark

26 The diagram shows a pentagon.

Not drawn accurately



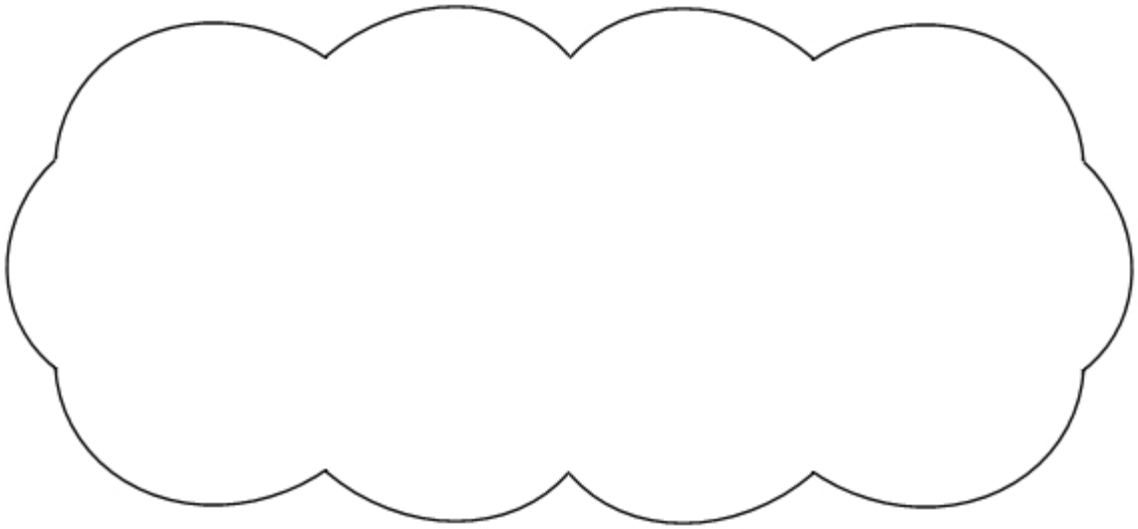
Each side of the pentagon is the **same length.**

Is the shape a **regular** pentagon?

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

Yes / No

Explain your answer.



1 mark

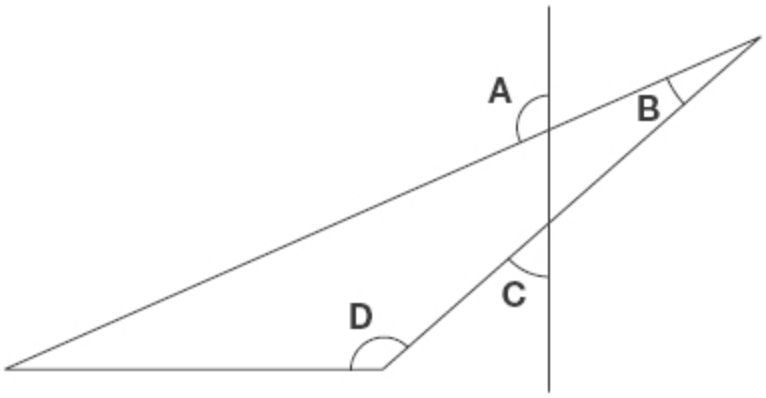
Work out the size of angle a

Show your method

$a =$ °

2 marks

27 This diagram has four angles marked **A**, **B**, **C** and **D**.

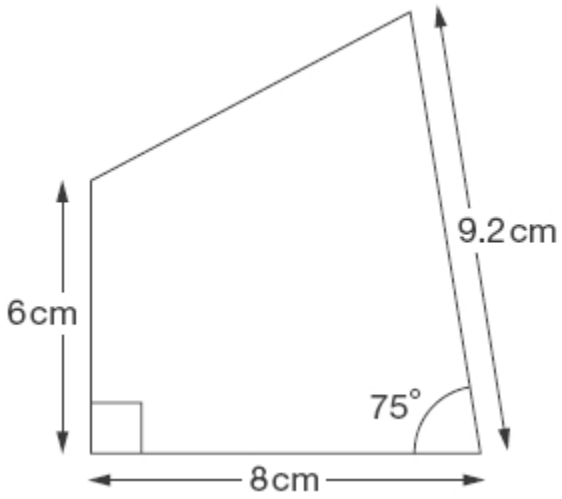


Write the letters of the angles that are **obtuse** angles.

1 mark

28 Here is a sketch of a quadrilateral.

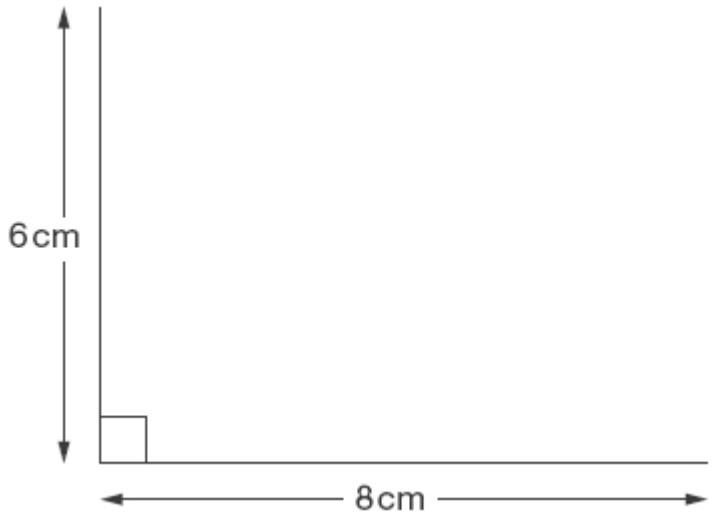
It is **not** drawn to scale.



Draw the full-size quadrilateral **accurately** below.

Use a protractor (angle measurer) and a ruler.

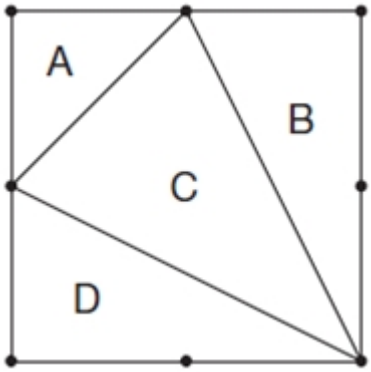
Two of the lines have been drawn for you.



2 marks

29 This diagram shows a square with dots at the vertices and at the middle of each side.

The square is divided into four triangles, **A**, **B**, **C** and **D**.



Write the letters of all the triangles that have a **right angle**.

_____

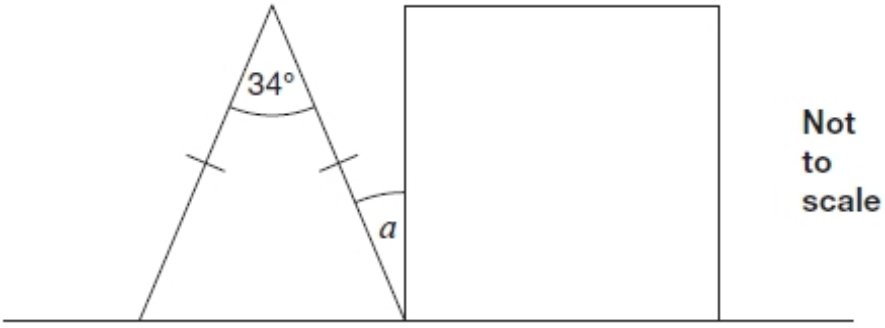
1 mark

Write the letters of all the triangles that have **two equal sides**.

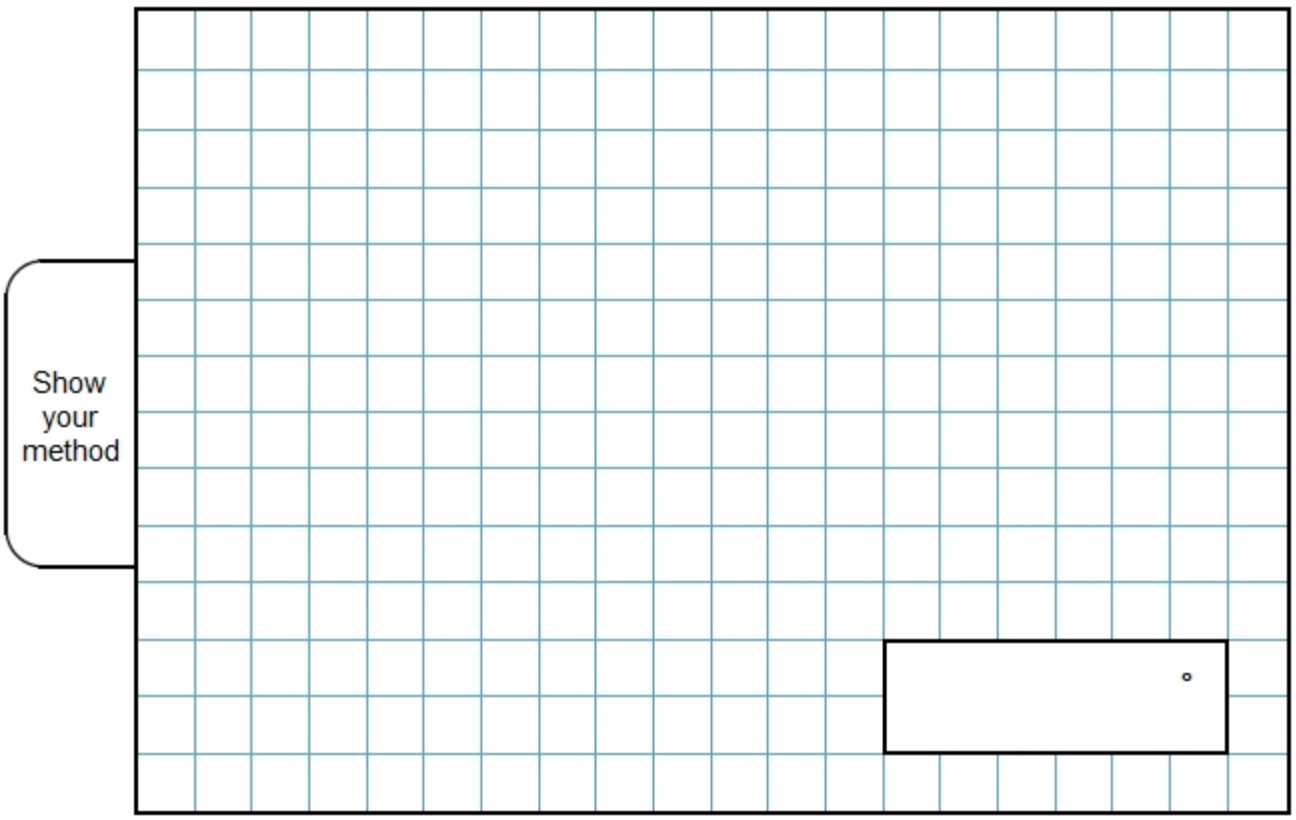
_____

1 mark

30 The diagram shows an isosceles triangle and a square on a straight line.

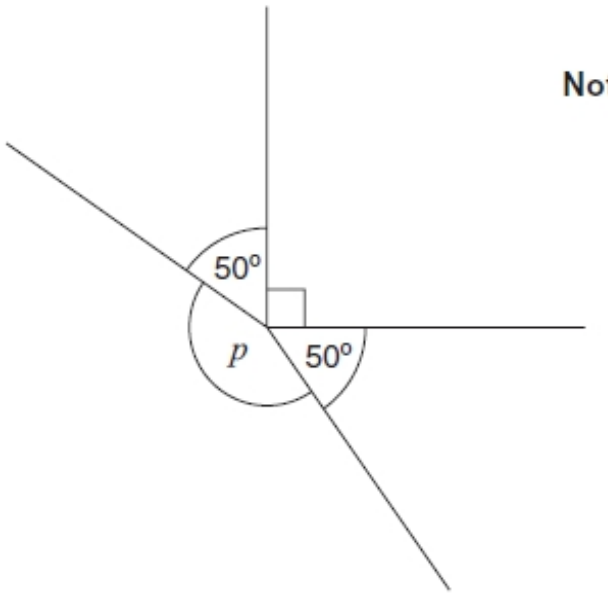


Calculate angle α.



2 marks

31



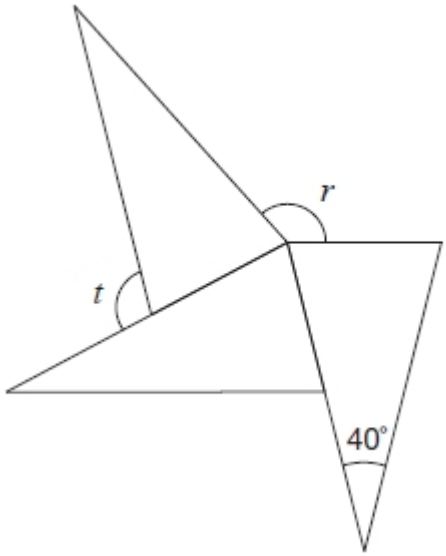
Calculate the size of angle $\boldsymbol{p}$ in the diagram.

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

Show your method

2 marks

32 The diagram shows three **identical** isosceles triangles.



What are the sizes of angles *r* and *t*?

Show your method

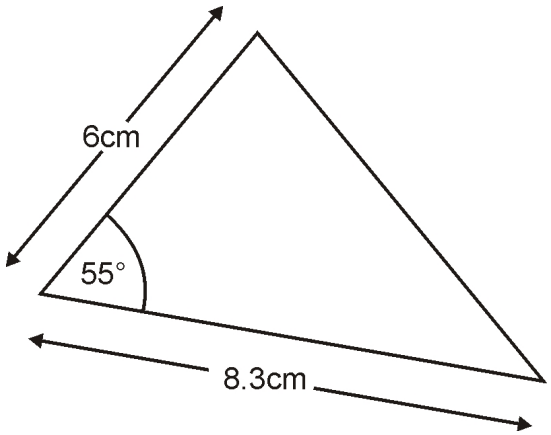
r = °

t = °

2 marks

33 Here is a sketch of a triangle.

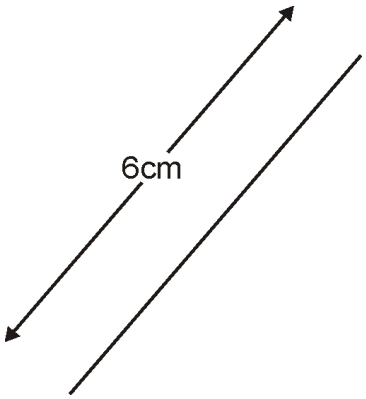
It is not drawn to scale.



Draw the full-size triangle accurately below.

Use a protractor (angle measurer) and a ruler.

One line has been drawn for you.



2 marks

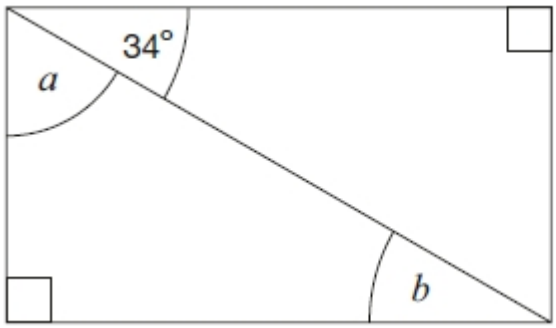
34 Anna has four **different** triangles.

Complete the table to show the size of the angles in each triangle.

Type of triangle	Angle 1	Angle 2	Angle 3
Isosceles	90°		
Right-angled	80°		
Isosceles	70°		
Isosceles	70°		

2 marks

35 Here is a rectangle.



Not to scale

Calculate the size of angles a and b.

Do **not** measure the angles.

$a =$ ____ °

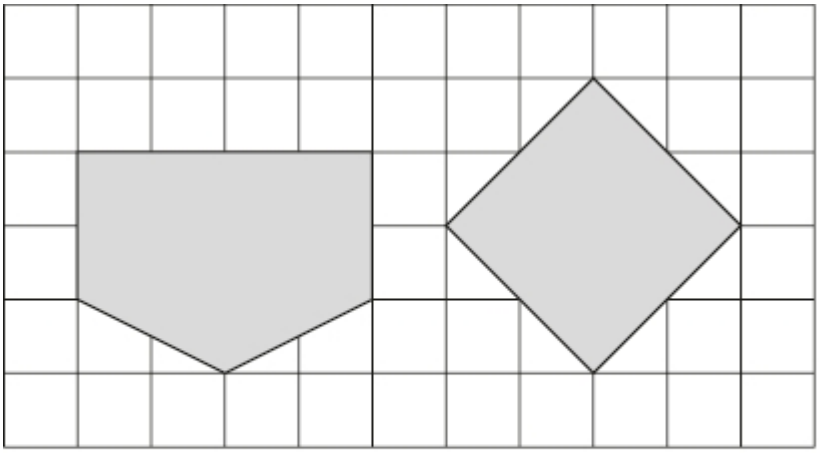
1 mark

$b =$ ____ °

1 mark

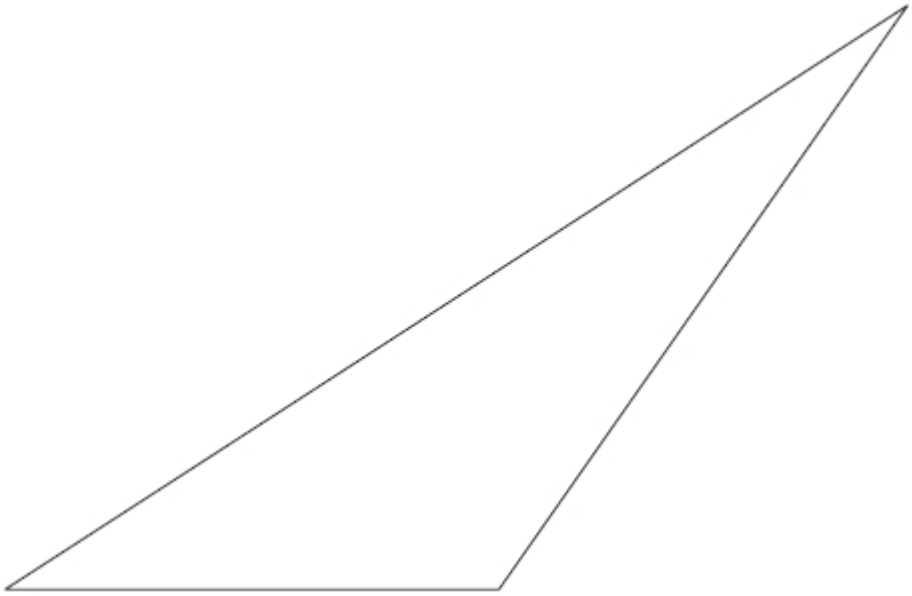
36 Here are two shapes on a square grid.

For each shape, write how many **right angles** it has.



1 mark

37

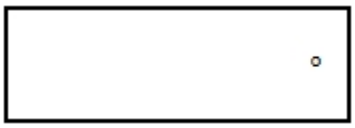


Measure the length of the shortest side of this triangle in millimetres.

mm

1 mark

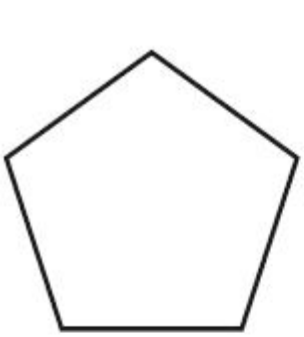
Measure the size of the largest angle in this triangle.

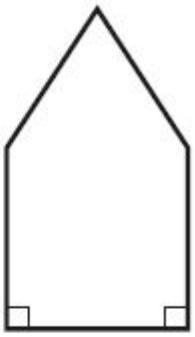


1 mark

38

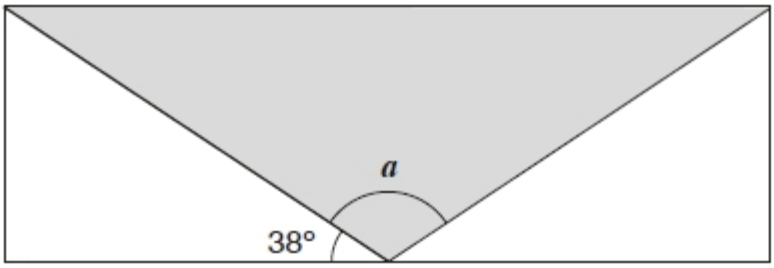
Circle the **pentagon** with exactly **four acute angles.**





1 mark

39 A shaded **isosceles** triangle is drawn inside a rectangle.



Not to scale

Calculate the size of angle a.

Show your method

°

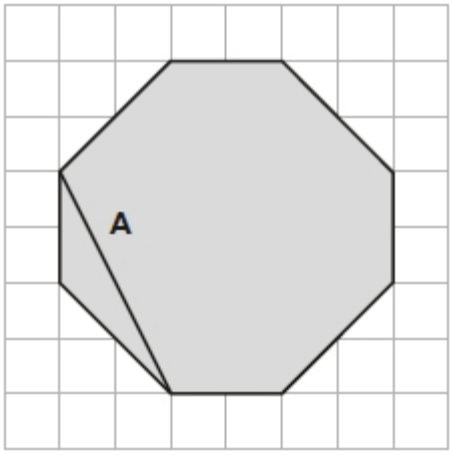
2 marks

40 The diagram shows a shaded octagon on a square grid.

Line **A** joins two vertices of the octagon.

Join two other vertices to draw a line **parallel** to line **A**.

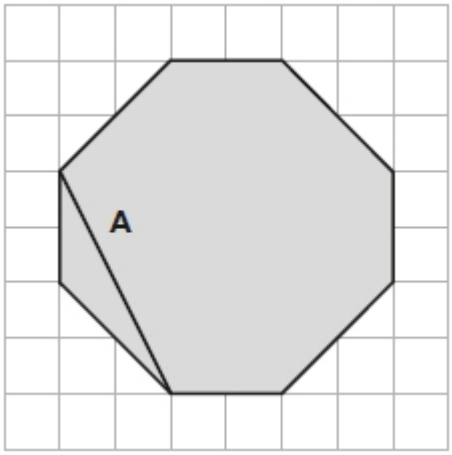
Use a ruler.



1 mark

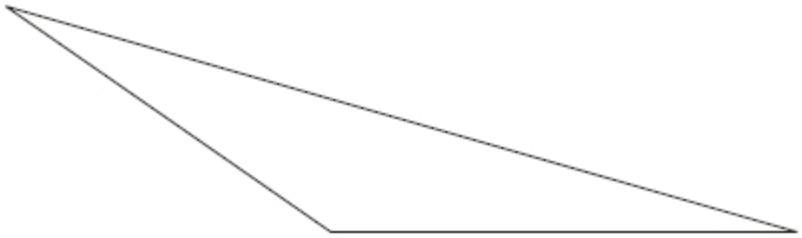
Join two vertices to draw a line **perpendicular** to line **A**.

Use a ruler.



1 mark

41 Here is a triangle.



Measure the shortest side accurately, in centimetres.

cm

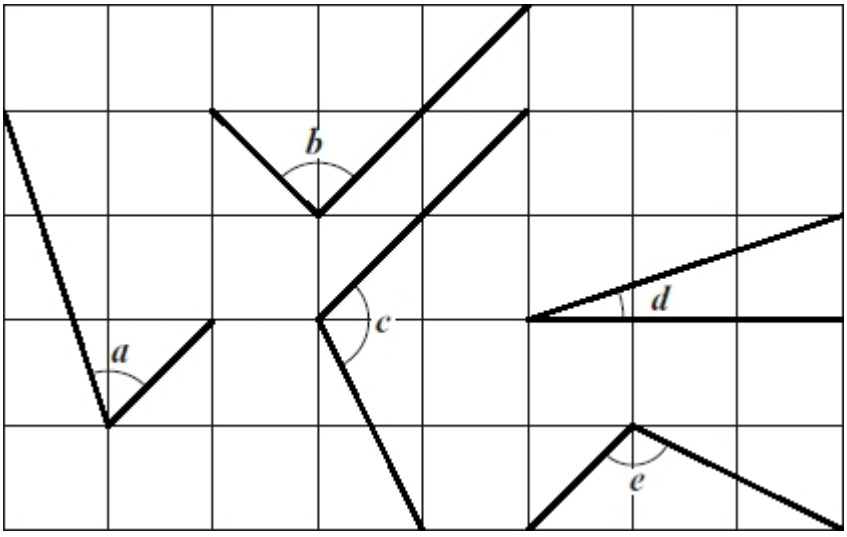
1 mark

Measure the largest angle.

°

1 mark

42 Here are five angles marked on a grid of squares.



Write the letters of the angles that are **obtuse**.

_____

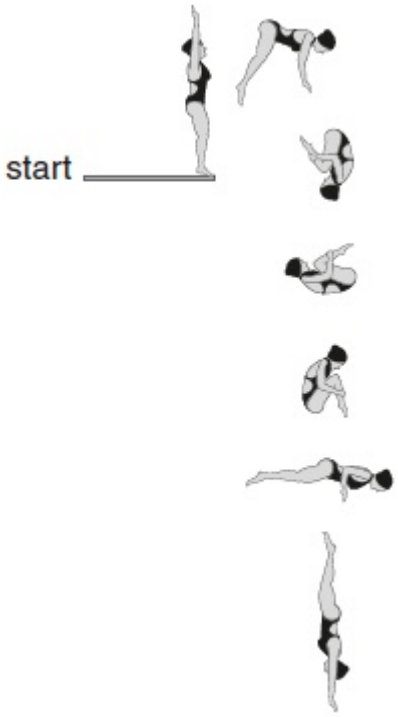
1 mark

Write the letters of the angles that are **acute**.

_____

1 mark

43 Layla completes one-and-a-half somersaults in a dive.

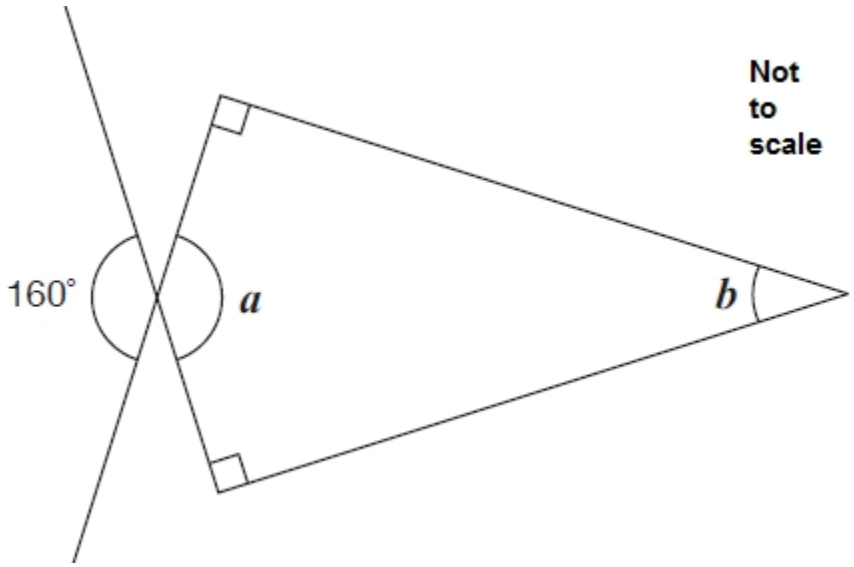


How many **degrees** does Layla turn through in her dive?

[ ] °

1 mark

44 Calculate the size of angles a and b in this diagram.



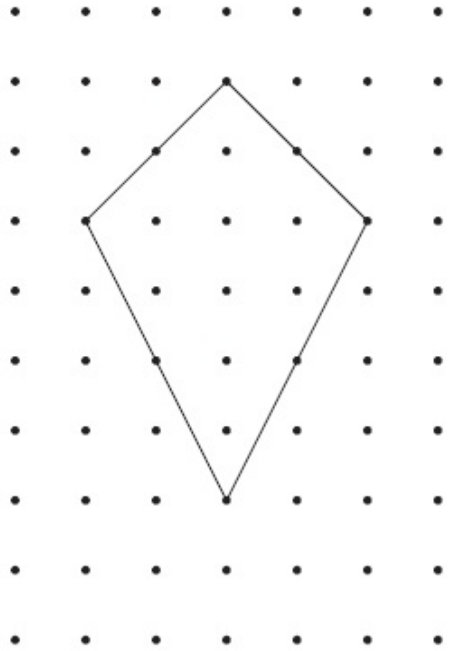
$a =$ ____ °

1 mark

$b =$ ____ °

1 mark

45 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

Mark schemes

1 (a) $x = 155°$

1

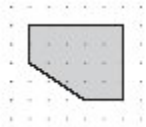
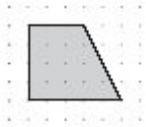
(b) $y = 85°$

*If answers for 5a and 5b are transposed, but otherwise correct, award **ONE** mark only, in the 5b box.*

1

[2]

2 Table completed as shown:

shape	number of right angles
	.....3.....
	.....2.....

***Both** numbers must be correct for the award of the mark.*

[1]

3 Award **TWO** marks for the boxes ticked and crossed as shown:

☑

☒

☒

☑

If the answer is incorrect, award **ONE** mark for any three boxes ticked or crossed correctly **OR** two boxes correctly ticked and the other two boxes left blank.

Up to 2

[2]

4 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]

5 Award **TWO** marks for three letters in the correct regions of the sorting diagram, as shown:

A		B
D	C	

Award **ONE** mark for two letters in the correct regions of the sorting diagram.

Do not *accept letters that are written in more than one region.*

Accept alternative indications such as lines drawn from the shapes to the appropriate regions of the sorting diagram.

Up to 2

[2]

6 270°

[1]

7 Letters written in order as shown:

fewest right angles			most right angles
C	A	B	D

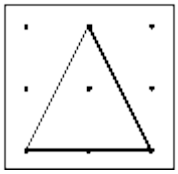
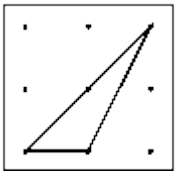
Letters must be in the correct order.

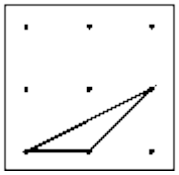
Accept the correct number of right angles written instead of letters, eg

fewest right angles			most right angles
C	2	3	4

[1]

8 Triangles without a right angle drawn in any orientation on the grid, eg


OR


OR


Do not *penalise lines drawn without a ruler, provided the intention is clear.*

Accept only triangles which have vertices at dots.

[1]

9 107

[1]

10 (a) x = 55°

1

(b) y = 145°

*If the answers for (a) and (b) are transposed, but otherwise correct, award **ONE** mark only, in the (b) box.*

1

[2]

11 Answers in the range 74° to 76° inclusive.

[1]

12 Table completed as shown:

	property of shape	
	is an octagon	has at least 1 right angle
shape A	✗	✓
shape B	✓	✗
shape C	✗	✗
shape D	✓	✓

***All three** answers must be correct for the award of the mark.*

Accept any other clear way of indicating the properties, such as 'Y' and 'N'.

[1]

13 Answer in the range 93 degrees to 97 degrees inclusive

[1]

14 $x =$ 35°

[1]

15 (a) B **AND** D

Both letters must be given.
Letters may be given in either order.

1

(b) C **AND** E

Both letters must be given.
Letters may be given in either order.

1

[2]

16

✗	✓
✓	✓
✓	✗
✗	✓

*Accept alternative unambiguous indications such as **Y** and **N**.*

(a) First column of table completed correctly.

1

(b) Second column of table completed correctly.

1

[2]

17 Award **TWO** marks for all three letters in the correct order as shown:

F

E

B

If the answer is incorrect, award **ONE** mark for two of the three letters correct.

Up to 2

[2]

18 An explanation (or diagram) which recognises that the sum of two obtuse angles would be greater than 180 degrees, eg:

- 'An obtuse angle is greater than 90 degrees and the angles of a triangle add up to 180 degrees'
- 'Two obtuse angles add up to more than 180'
- '180 degrees is less than two obtuse angles'
- 'It must have at least two acute angles'
- 'The shape would need more than 3 sides to join up'
- 

Do not *accept answers that refer only to the properties of obtuse angles* ***OR*** *to the angles of a triangle, eg:*

- *'The angles of a triangle add up to 180 degrees'*
- *'Obtuse angles are greater than 90 degrees'.*

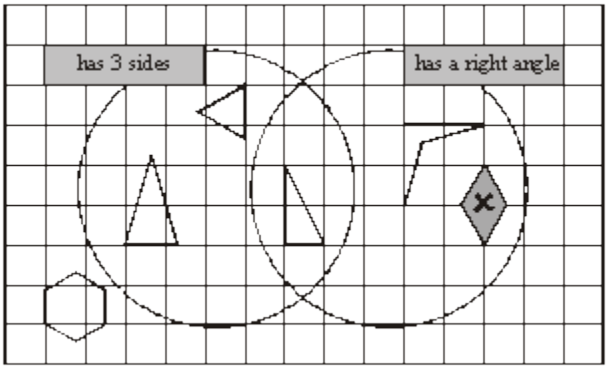
Do not *accept vague or incomplete explanations, eg:*

- *'A triangle cannot have two obtuse angles'*
- *'Obtuse angles would be too big'*
- *'You can only have acute angles'.*

U1

[1]

19 One shape crossed as shown:



Do not *award the mark if additional incorrect shapes are indicated.*

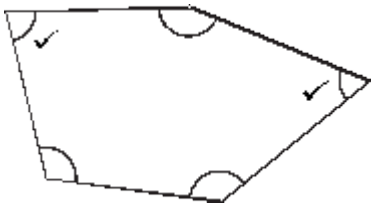
Accept alternative unambiguous indications of the correct shape, eg shape ticked or circled.

[1]

20 25

[1]

21 Two angles ticked as shown:



Do not *award the mark if additional incorrect angles are ticked.*

Accept alternative unambiguous indications of the correct angles, eg angles circled.

[1]

22 (a) C **AND** D

Letters may be given in either order.

1

(b) A **AND** D

Letters may be given in either order.

1

[2]

23 $b = 50$

1

$a = 20$

1
U1

As evidence of a correct method, in either part, shows or implies that the angles in one of the triangles are a, b and b

eg, in the first question part

- 80, 50, 50 seen
- (180 – 80) ÷ 2
- (360 – 160) ÷ 2 ÷ 2

eg, in the second question part

- 180 – 2 × 80
- (360 – 160 × 2) ÷ 2

eg, correct answers transposed

! Incomplete or no working shown

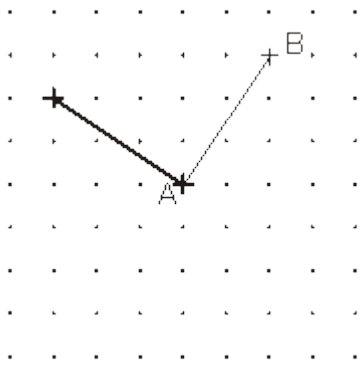
Provided at least one correct angle is credited, award this mark

! In the second question part 80, 80, 20 is insufficient without any indication of the position of the equal angles

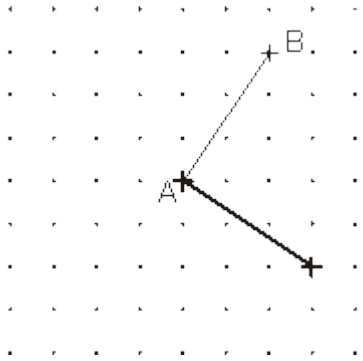
1

[3]

24 Line drawn from A to one of the two dots marked as shown:



OR



Accept slight inaccuracies in drawing

[1]

25 Joins dots to make a triangle that has only one side of 4 cm and only one angle of 45°.

! Lengths or angles shown on their triangle(s)
Ignore, even if incorrect

***Do not accept** dots not used*

U1

[1]

26 Indicates No and gives a correct explanation

eg

- The angles are not the same size
- A regular pentagon looks like this,  with its angles all the same size
- All the angles should be 108°
- It doesn't have rotation symmetry
- It's got more sides than a square so all its angles should be obtuse, but they're not

1

60°

2

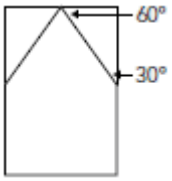
Shows that the 150° angle can be split into 90° and 60°

or

Divides the pentagon vertically and shows that half a is 30°

or

Draws triangles to show a rectangle, labelling the non-right angles on at least one side correctly
eg

- 

or

Shows or implies that the angle sum of a pentagon is 540°

1

Accept minimally acceptable explanation
eg

- *90 ≠ 150*
- *Different angles*
- *A regular pentagon doesn't have right angles in it*
- *A regular one can't have 150° angles*
- *It doesn't look the same when it's turned*
- *Not all the angles are obtuse*

! Incorrect angle size for a regular pentagon given
Condone alongside a correct response
eg, accept

- *The angles are different, they should be 60° (error, but all equal implied)*
- *The angles should all be 70° (error)*

eg, do not accept

- *The 90° angles should be 60° (does not imply the angles should all be the same)*

***Do not accept** incomplete explanation*
eg

- *Not the same*
- *It has two right angles*
- *Two angles are the same*
- *A regular pentagon looks like this* 
- *A regular pentagon doesn't have any vertical lines*

! Indicates Yes, or no decision made, but explanation clearly correct
Condone provided the explanation is more than minimal

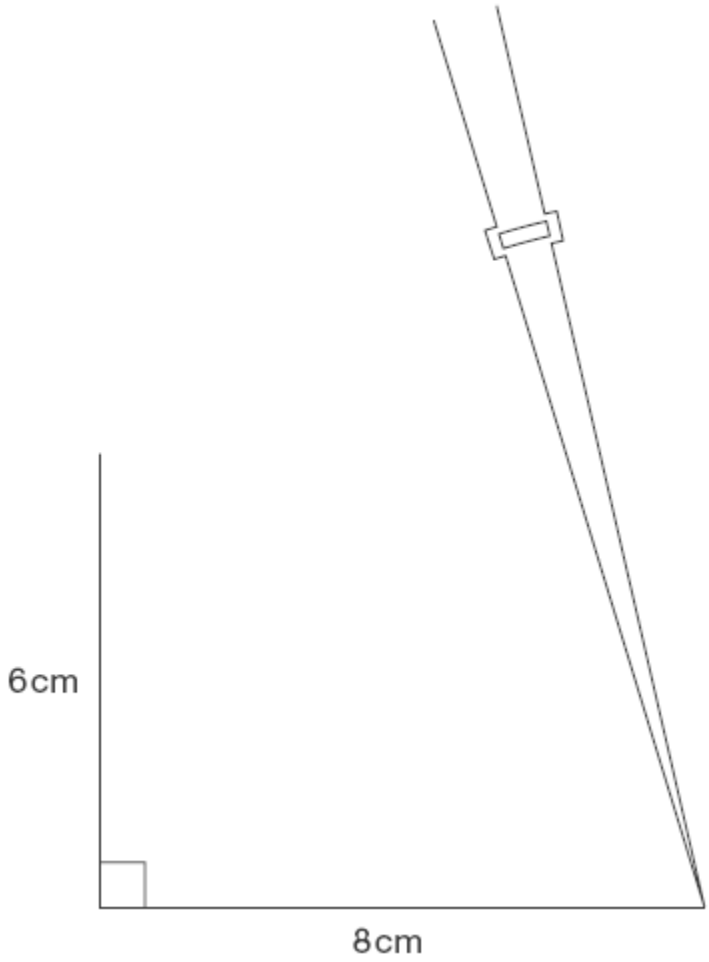
[3]

27 A **AND** D

Letters may be given in either order.

[1]

28 Markers will use a transparent overlay of this page to mark pupils' answers to this question.



Award **TWO** marks for a quadrilateral drawn with an angle in the range 73° to 77° inclusive **AND** length of sloping line in the range 9.1 cm to 9.3 cm inclusive (ie upper vertex of quadrilateral within inner box on diagram).

If the answer is incorrect, award **ONE** mark for:

- a completed quadrilateral drawn with an angle in the range 73° to 77° inclusive

OR

- a completed quadrilateral drawn with an angle in the range 72° to 78° inclusive **AND** length of sloping line in the range 9.0 cm to 9.4 cm inclusive.

Accept drawings where any side has been extended past a vertex.

Accept drawings which do not use the given 8 cm base line, provided they have used a line with a length in the range 7.8 cm to 8.2 cm inclusive.

*Accept for **ONE** mark drawings not using the given 8 cm base line which have a base line outside the range 7.8 cm to 8.2 cm, provided they have an angle in the range 73° to 77° inclusive **AND** a sloping line in the range 9.1 cm to 9.3 cm inclusive.*

*Accept for **ONE** mark drawings of incomplete quadrilaterals, provided they have an angle in the range 73° to 77° inclusive **AND** a sloping line in the range 9.1 cm to 9.3 cm inclusive.*

Up to 2

[2]

29 (a) A **AND** B **AND** D

Letters may be given in any order.

1

(b) A **AND** C

Letters may be given in any order.

1

[2]

30 17

! Answer written on diagram

Accept providing there is no ambiguity

2

or

73° seen (*one of the other angles in the isosceles triangle*)

OR

Shows or implies a complete correct method, eg:

- 180 − 34 = 144 *(error)*

  144 ÷ 2 = 72

  90 – 72 = 28 *(error)*

1

[2]

31 Award **TWO** marks for correct answer of 170°

Up to 2

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

- 50 + 50 + 90 = 190

  360 – 190

OR

- 360 – 50 – 50 – 90

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

Up to 2

[2]

32 $r = 150$ **and** $t = 110$

Values must be unambiguously associated with the correct letter for the award of 2m or 1m

2

or

r **or** t correct

OR

Shows or implies a complete, correct method for both angles, eg:

- 40 + 50 + 50 = 180 *(error)*
  360 − 50 − 50 − 50 = 210
  180 − 50 = 130

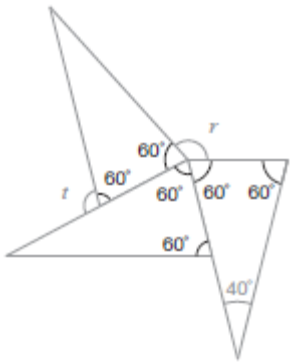
  ! Answers for r and t transposed

  If r is 110 and t is 150, then award 1m

  ! Follow-through from incorrect base angle seen on the diagram

  Award 1m if both r and t correctly follow through from an incorrect angle seen at base of an isosceles triangle, eg:

-



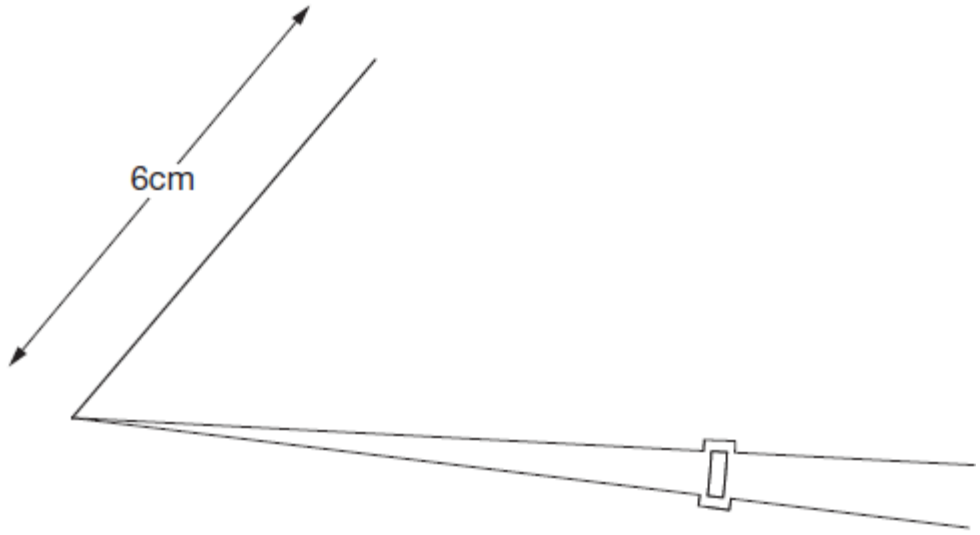
r = 360 − 180 = 180

t = 180 − 60 = 120

1

[2]

33 Award **TWO** marks for a triangle drawn with an angle in the range 53° to 57° inclusive **AND** length of base line in the range 8.2cm to 8.4cm inclusive (ie lower vertex of the triangle within the inner box on the diagram, see below).



If the answer is incorrect, award **ONE** mark for:

- a completed triangle drawn with an angle in the range 53° to 57° inclusive.

OR

- a completed triangle drawn with an angle in the range 52° to 58° inclusive **AND** length of base line 8.1cm to 8.5cm inclusive.

Accept drawings where any side has been extended past a vertex.

Accept drawings which do not use the given 6cm line, provided they have used a line with a length in the range 5.9cm to 6.1cm inclusive.

*Accept for **ONE** mark drawings not using the given 6cm line which have used a line **outside** the range 5.9cm to 6.1cm inclusive, provided they have an angle in the range 53° to 57° inclusive **AND** a base line in the range 8.2cm to 8.4cm inclusive.*

*Accept for **ONE** mark drawings of **incomplete triangles**, provided they have an angle in the range 53° to 57° inclusive **AND** a base line in the range 8.2cm to 8.4cm inclusive.*

Up to 2m

[2]

34 Completes all four rows of the table correctly, eg:

90°	**45°**	**45°**
80°	**90°**	**10°**
70°	**70°**	**40°**
70°	**55°**	**55°**

Accept angles within a row in either order

Accept the bottom two rows may be given in either order

! Condone omission of degree signs

! For 2 marks, do not accept correct angles in 3rd row repeated in 4th row, in either order

2

or

Completes three rows correctly

1

[2]

35 (a) 56

1

(b) 34

*If the answers to (a) and (b) are incorrect, award **ONE** mark if their (a) plus their (b) = 90°, provided that (b) is **not** 45°, 30° or 60°.*

1

[2]

36 2 **AND** 4

Accept alternative unambiguous indications, eg right angles marked on diagrams.

[1]

37 (a) Answer is teacher's measurement +/- 2 mm.

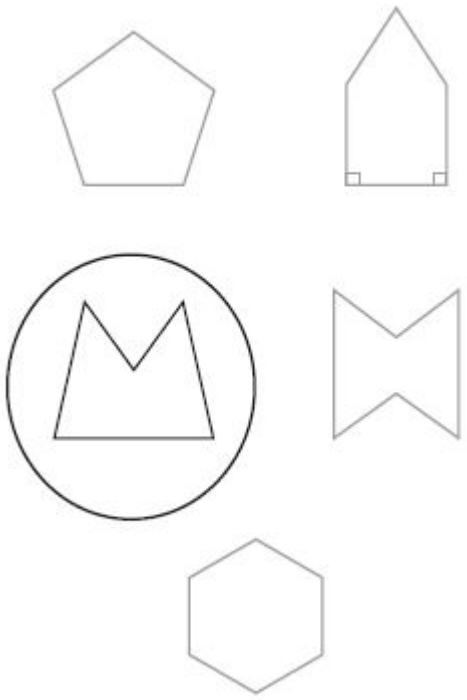
1

(b) Answer in the range 123° to 127° **inclusive**.

1

[2]

38 The correct shape circled as shown:



Accept alternative unambiguous positive indications, e.g. shape ticked.

[1]

39 Award **TWO** marks for the correct answer of 104°.

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g:

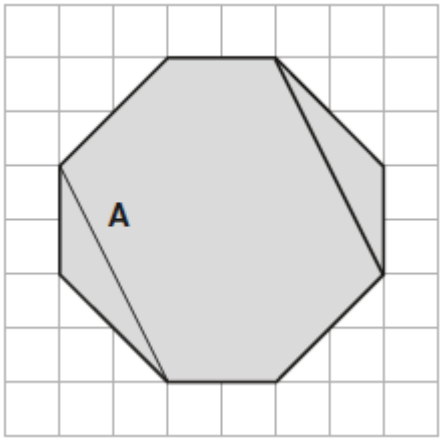
- 180 − 38 − 38 = a

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

Up to 2

[2]

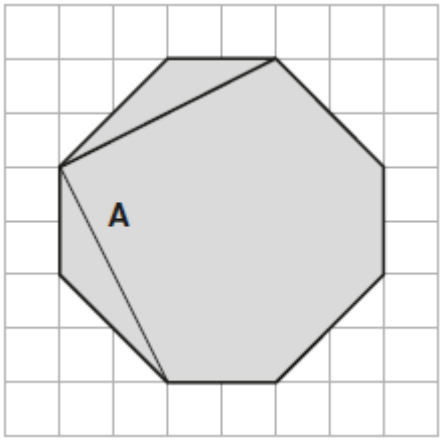
40 (a) Line drawn parallel to A, as shown:



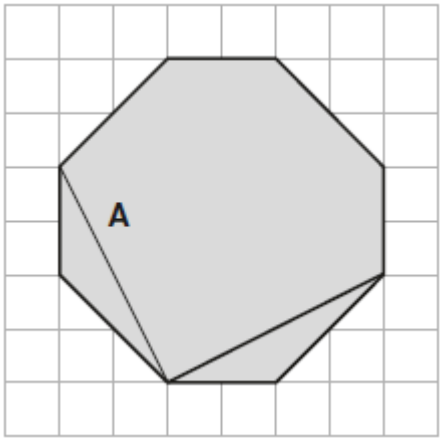
Accept slight inaccuracies in drawing, provided the intention is clear.

1

(b) Line drawn perpendicular to A, as shown:



OR



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

1

[2]

41 (a) Answer is teacher's measurement +/- 2 mm.

1

(b) Answer in the range 143° to 147° **inclusive**.

Commentary: Some measures questions specify the unit to be used. Where the unit is given in the question lozenge and in the answer box, it must be used. If pupils express their answers using a different unit, e.g. as 57 mm in the first part of this question, the mark will not be awarded.

1

[2]

42 (a) *c* **AND** *e*

Letters may be given in either order.

1

(b) *a* **AND** *d*

Letters may be given in either order.

1

[2]

43 540

[1]

44 (a) 160

1

(b) 20

*If the answers to a and b are incorrect, award **ONE** mark if a + b = 180° unless b is between 33° and 37° inclusive, or 90°.*

1

[2]

45 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]