

Properties of shapes and congruence

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 60 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 13): you must not use a calculator.
- **Section B** (questions 14 to 20): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 53.

Advice

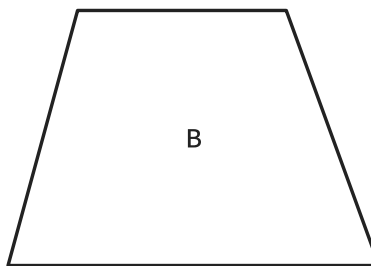
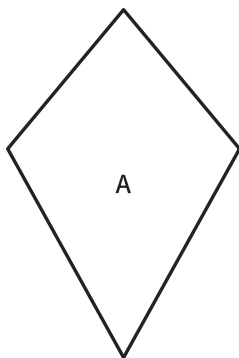
- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

Q	Mark	Q	Mark
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	
TOTAL			

Section A**You must not use a calculator**Do not
write
outside
the box

- 1** Here are two quadrilaterals.



- (a)** Write down the mathematical name of shape A.

Answer _____

[1 mark]

- (b)** Write down the mathematical name of shape B.

Answer _____

[1 mark]

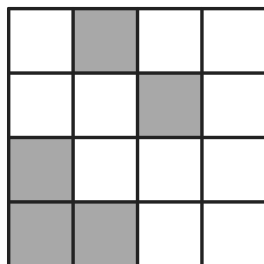
- 2** Lena says,
“A quadrilateral with four equal sides must be a square.”

Is Lena correct?

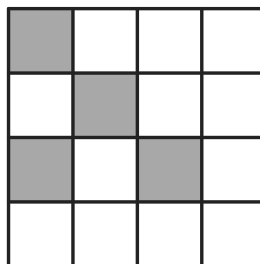
Give a reason for your answer.

[1 mark]

- 3** Here are two patterns on square grids.



Pattern A



Pattern B

- (a) Shade **one** more square on pattern A so that the pattern has a line of symmetry.

[1 mark]

- (b) Shade **two** more squares on pattern B so that the pattern has rotational symmetry of order 2

[1 mark]

- 4** A type of quadrilateral has diagonals that always cross at right angles.
Its diagonals are not always the same length.

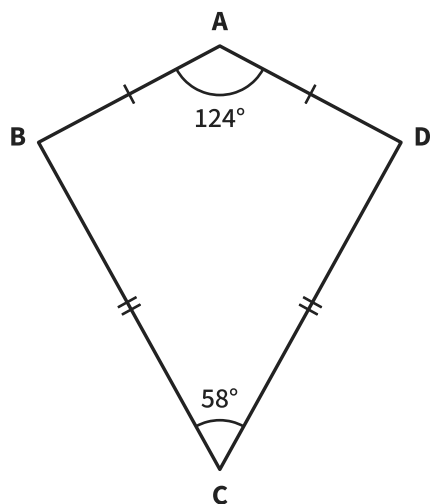
Circle the name of this type of quadrilateral.

square rectangle rhombus parallelogram

[1 mark]

- 5 ABCD is a kite with $AB = AD$ and $CB = CD$.

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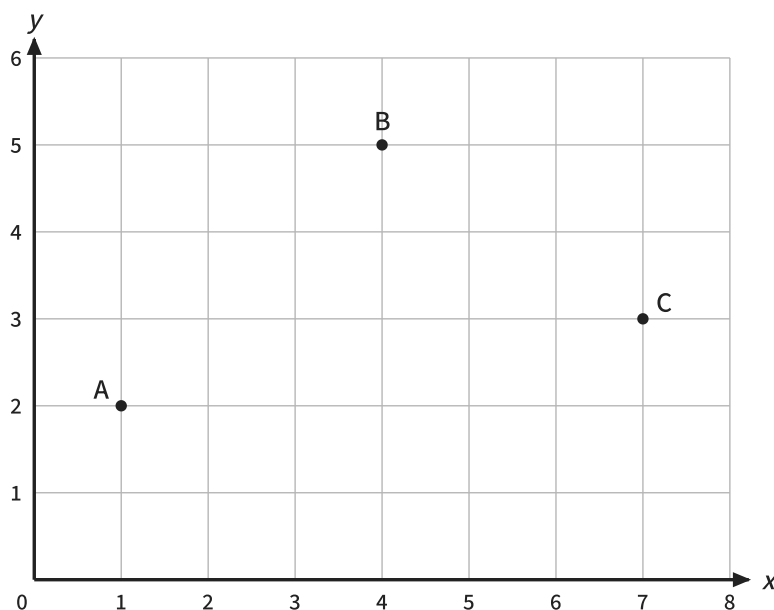
Not drawn accurately

Work out the size of angle ABC.

Answer _____ degrees
[2 marks]

- 6 A, B and C are three vertices of a parallelogram ABCD.

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outside
the box



- (a) Write down the coordinates of D.

Answer _____

[1 mark]

- (b) The diagonals of the parallelogram cross at the point M.
Write down the coordinates of M.

Answer _____

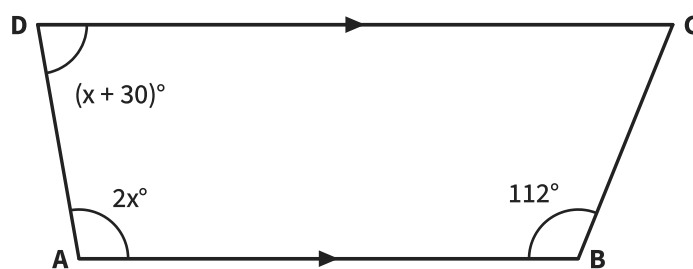
[1 mark]

- 7 An isosceles triangle has an angle of 40°
Hamid says,
“The other two angles must be 70° and 70° ”

Is Hamid correct?
You must show your working.

[2 marks]

- 8 ABCD is a trapezium.
AB is parallel to DC.



Not drawn accurately

- (a) Work out the value of x .

Answer _____

[3 marks]

- (b) Is ABCD an isosceles trapezium?
Give a reason for your answer.

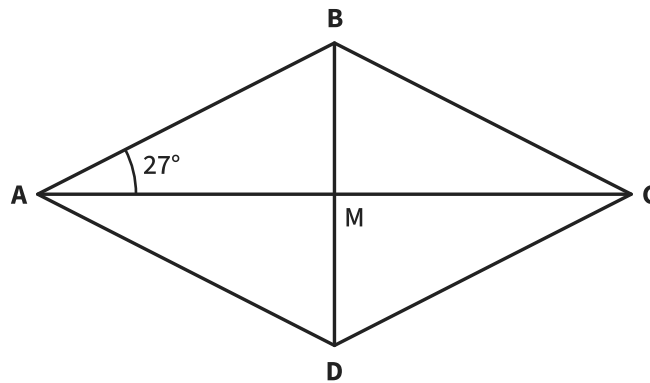
[1 mark]

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9

ABCD is a rhombus.
The diagonals AC and BD cross at M.

Do not
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the box



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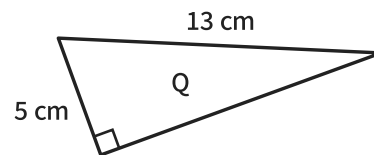
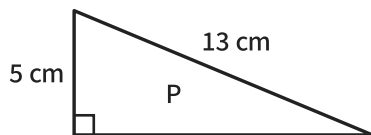
Work out the size of angle ABC.

Answer _____ degrees

[3 marks]

10

Triangles P and Q are congruent.



Not drawn accurately

(a) Circle the condition that shows the triangles are congruent.

SSS SAS ASA RHS

[1 mark]

(b)

Jo says,

“Two triangles both have angles of 40° , 60° and 80°

So the two triangles must be congruent.”

Is Jo correct?

Give a reason for your answer.

[1 mark]

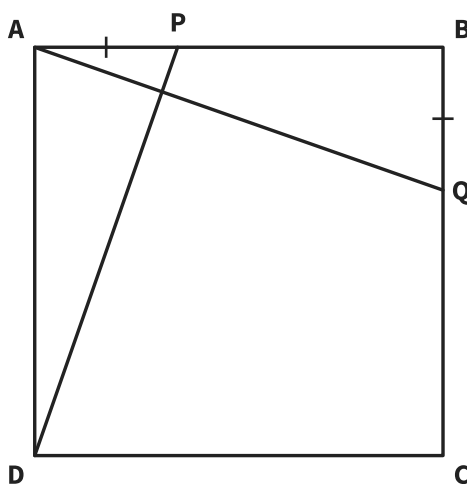
- 11** The four angles of a quadrilateral, in no particular order, are in the ratio $2 : 2 : 7 : 7$
Ella says,
“The quadrilateral must be a parallelogram.”

Is Ella correct?

You must show your working.

[2 marks]

- 12** ABCD is a square.
P is a point on AB and Q is a point on BC so that $AP = BQ$.



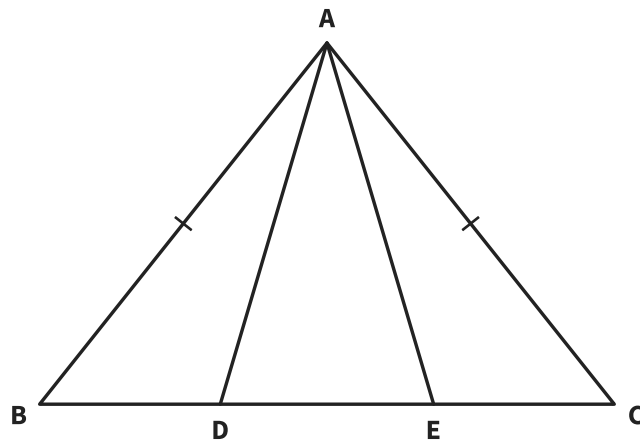
Not drawn accurately

Prove that triangle DAP is congruent to triangle ABQ.

[3 marks]

- 13** ABC is an isosceles triangle with $AB = AC$.
D and E are points on BC so that $BE = CD$.

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the box



Not drawn accurately

Prove that $AD = AE$.

[4 marks]

Section B



You may use a calculator

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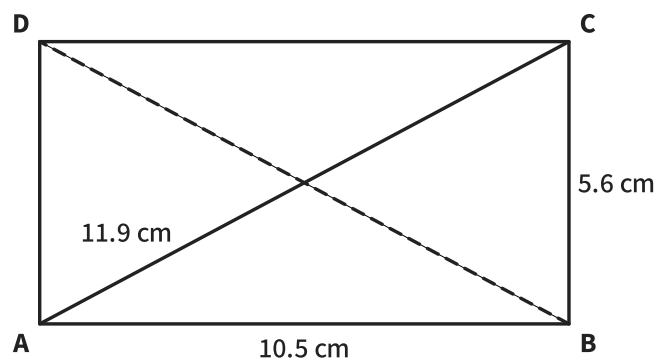
- 14** A rhombus has sides of length 7.35 cm
A regular pentagon has the same perimeter as the rhombus.

Work out the length of one side of the regular pentagon.

Answer _____ cm

[3 marks]

- 15** ABCD is a rectangle.



Not drawn accurately

- (a) Write down the length of BD.

Answer _____ cm

[1 mark]

- (b) Work out the area of the rectangle.

Answer _____ cm^2

[2 marks]

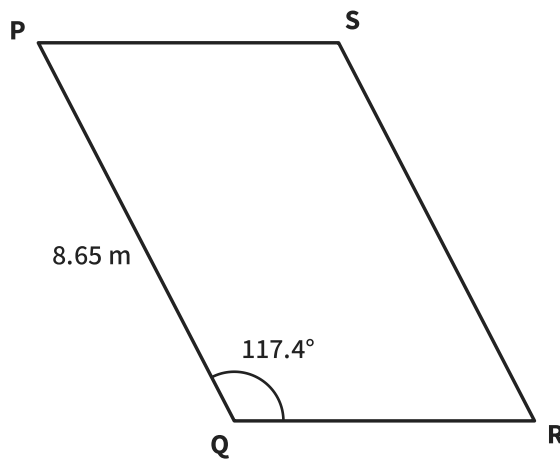
- 16** A rectangle is 14.4 cm long and 6.25 cm wide.
A square has the same area as the rectangle.
- Work out the length of one side of the square.
Give your answer to 1 decimal place.

Do not
write
outside
the box

Answer _____ cm

[3 marks]

- 17** A paved courtyard, PQRS, is a parallelogram.
PQ = 8.65 m and angle PQR = 117.4°



Not drawn accurately

- (a)** Find angle QRS.
Give a reason for your answer.

Answer _____ degrees
[2 marks]

- (b)** A low wall runs all the way around the courtyard.
The wall is 29.5 m long altogether.
Work out QR.

Answer _____ m
[2 marks]

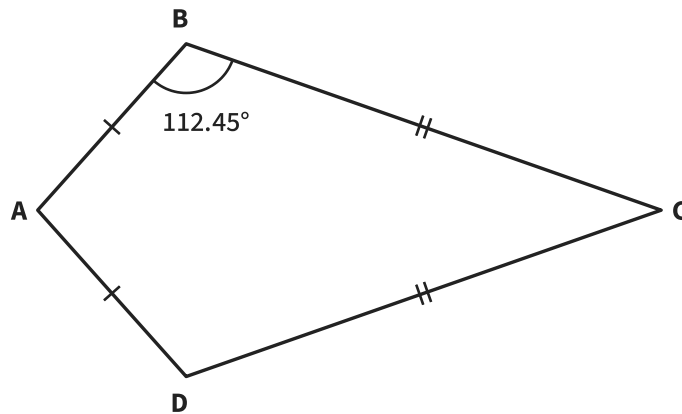
- 18** ABCD is a parallelogram.
The perimeter of ABCD is 47.2 cm
AB is 3.4 cm longer than BC.

Work out the length of AB.

Answer _____ cm

[3 marks]

- 19** ABCD is a kite with $AB = AD$ and $CB = CD$.
Angle $ABC = 112.45^\circ$
Angle BAD is 2.5 times the size of angle BCD.



Not drawn accurately

Work out the size of angle BAD.

Answer _____ degrees

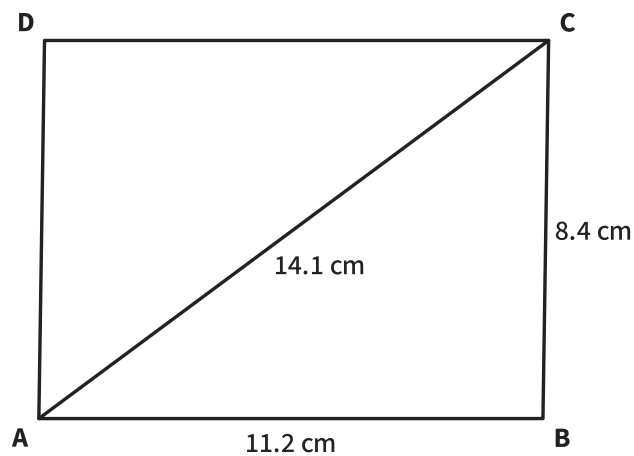
[4 marks]

20

Ravi makes a frame ABCD from four rods and one diagonal rod AC.

$AB = DC = 11.2$ cm, $BC = AD = 8.4$ cm and $AC = 14.1$ cm

Do not
write
outside
the box



Not drawn accurately

Is ABCD a rectangle?

You must show your working.

[3 marks]

END OF QUESTIONS