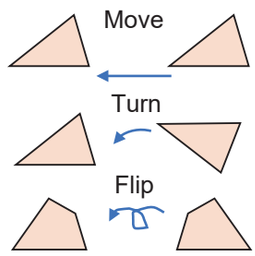
5 – 1 Congruent Figures

Figures that Overlap Exactly

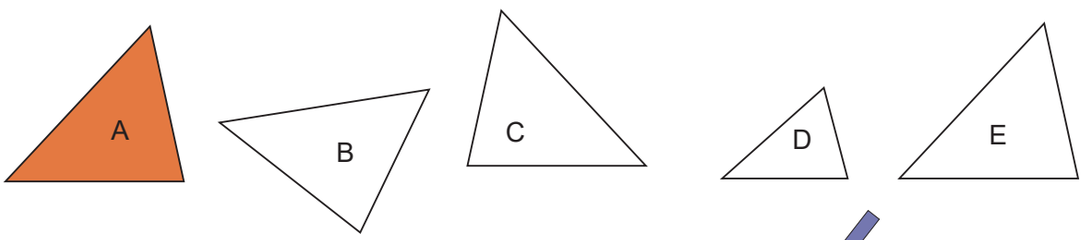
Instruction What is congruent?

- Two figures are said to be **congruent** when both overlap exactly after moving, turning, or flipping them.
- Congruent figures have the same shape and size.



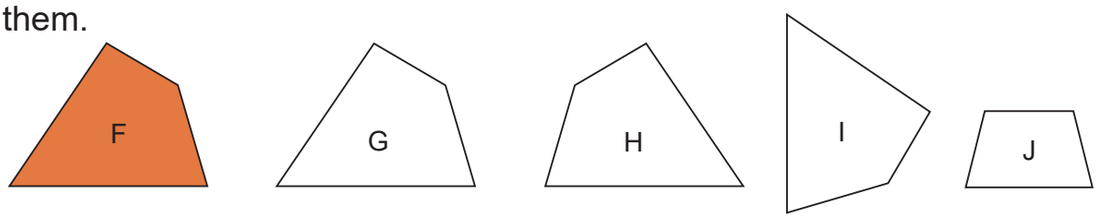
How can we find out congruency when you can't overlap two figures?

Example Find the congruent figures to figure A below and by how you can find them.



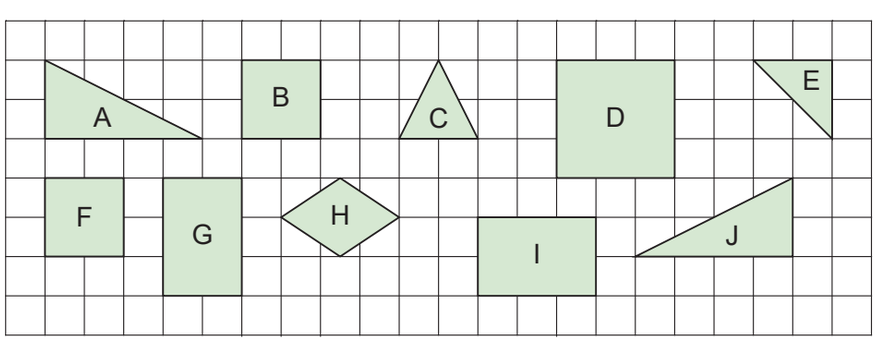
Moving E Turning B Flapping C

1 Find the congruent figures to figure F below and by how you can find them.



Moving ☐ Turning ☐ Flapping ☐

2 Find pairs of the congruent figures.



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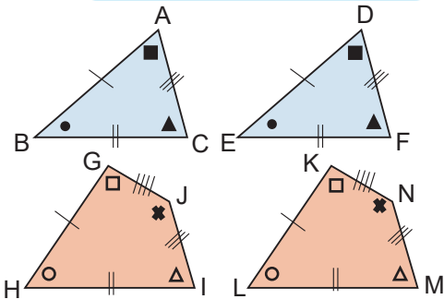
5 - 2 Congruent Figures

Properties of Congruent Figures

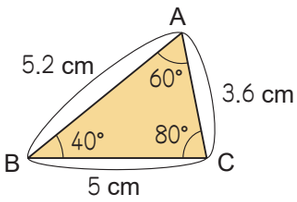
Instruction Properties of congruent figures

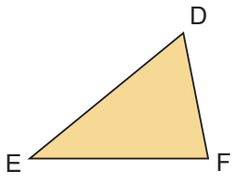
The same symbol indicates the same length or angle.

- In congruent figures, the corresponding sides have equal lengths. For example, of the triangles, AB and DE, BC and EF, CA and FD.
- The corresponding angles have equal sizes. For example of the quadrilaterals, A and D, B and E, C and F,



Example The following triangles are congruent. Answer the following questions.





1. Which is the corresponding vertex to vertex C?

   Vertex [F]

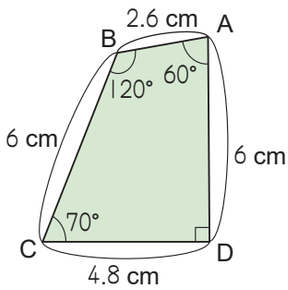
2. Which is the corresponding angle to angle E? Also, how many degrees is the size?

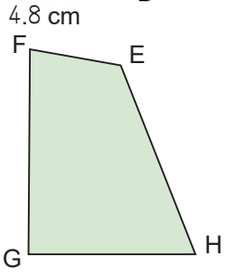
   Angle [B] Size [40°]

3. Which is the corresponding side to side DF? Also, how many cm is it?

   Side [AC] Length [3.6 cm]

The following quadrilaterals are congruent. Answer the following questions.





1. Which is the corresponding vertex to vertex E?

   Vertex [ ]

2. Which is the corresponding angle to angle H? How many degrees is it?

   Angle [ ] Size [ ]

3. Which is the corresponding side to side FG? How many cm long is it?

   Side [ ] Length [ ]

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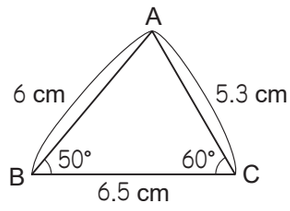
5 – 3 Whole Numbers & Decimal Numbers

How to Draw Congruent Triangles

Instruction How to draw a triangle that is congruent to the triangle shown below.

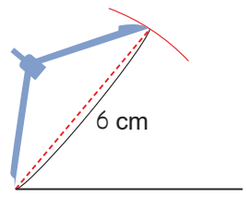
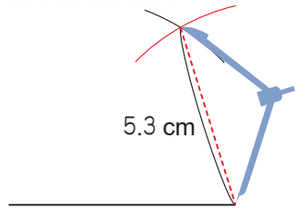
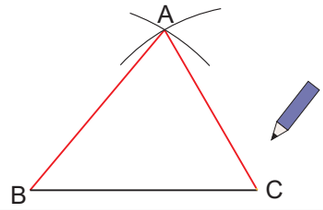
If we determine where the three vertices are, we can draw a triangle.

We can measure the length and draw side BC. The problem is how we determine the position of vertex A.

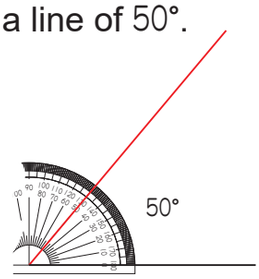
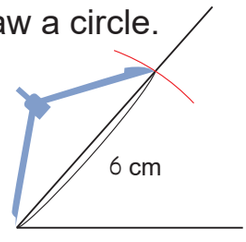
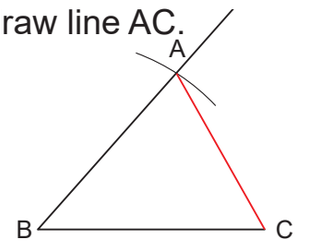


On how to determine the position of vertex A, we have the following measurements.

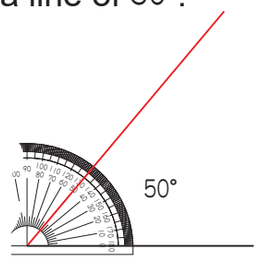
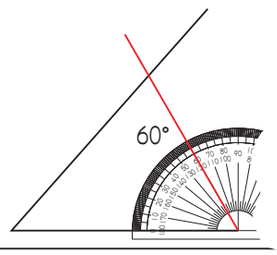
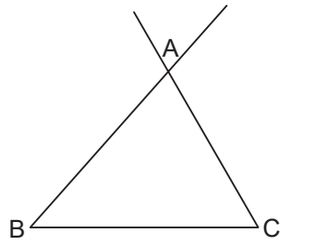
1 Measure the length of the 3 sides, BC, AB, AC and then draw them.

Measure 6 cm and draw a circle.	Measure 5.3 cm and draw a circle.	A is determined and draw line AB, AC.
		

2 Measure the length of the 2 sides and the angle in between, and then draw them.

Draw a line of 50°.	Measure 6 cm and draw a circle.	A is determined and draw line AC.
		

3 Measure the length of the 1 side. Measure the angles formed by that side with the other two sides, and then draw them.

Draw a line of 50°.	Draw a line of 60°.	A is determined.
		

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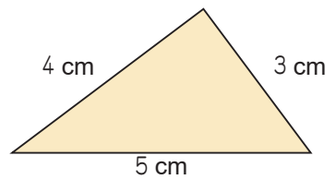
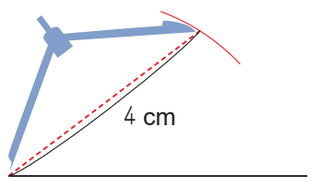
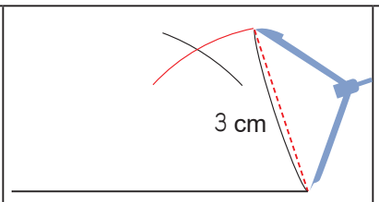
Example Draw a triangle that is congruent to the triangle shown below.

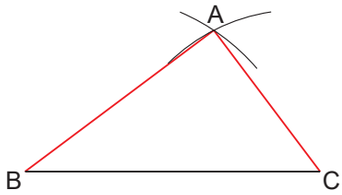
1



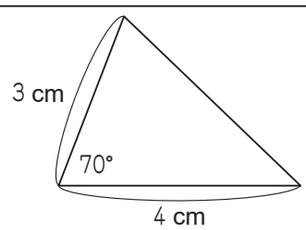
Measure the length of the 3 sides and then draw it.



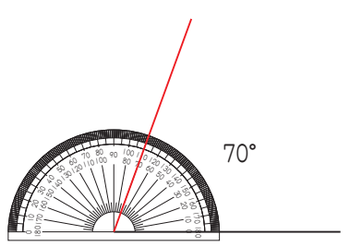




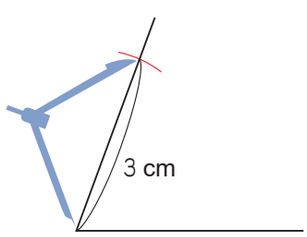
2



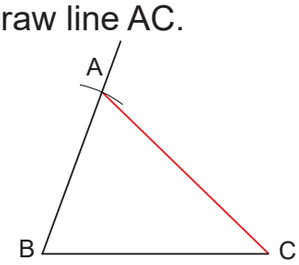
Draw a line of 70°.



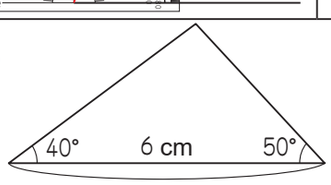
Measure 3 cm and draw a circle.



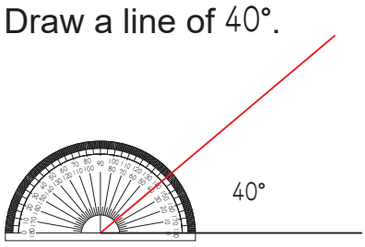
A is determined and draw line AC.



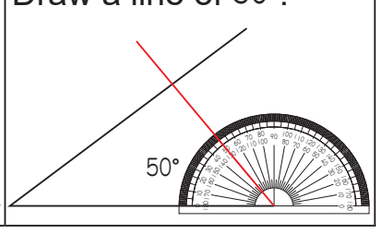
3



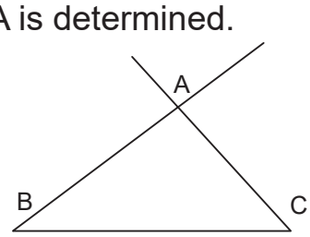
Draw a line of 40°.



Draw a line of 50°.

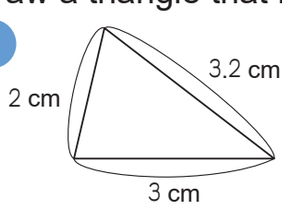


A is determined.

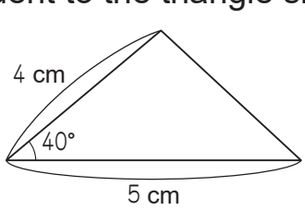


Draw a triangle that is congruent to the triangle shown or described below.

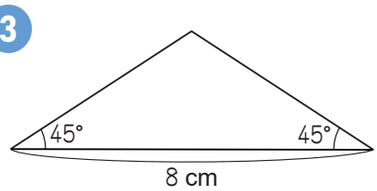
1



2



3



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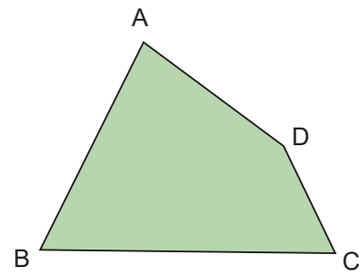
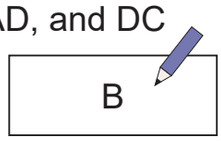
5 – 4 Congruent Figures

How to Draw Congruent Quadrilaterals

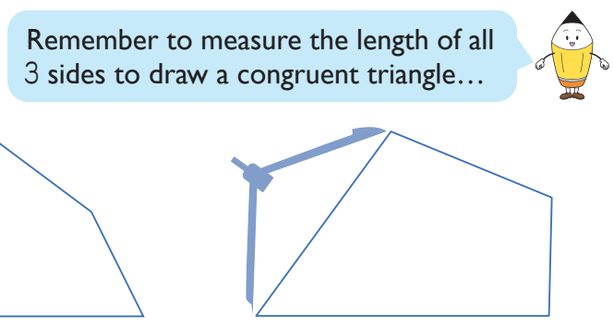
Example 1 When you draw a congruent quadrilateral, which sides and angles you should measure?



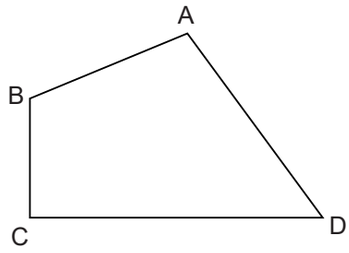
Set A: Side BC, AB, AD, and DC
Set B: Side BC, angle B, AB, AD, and DC



Why Set A is wrong?



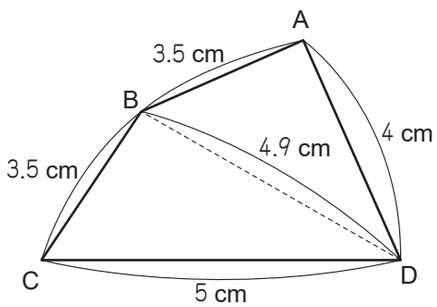
1 When you draw a congruent quadrilateral, which set of the length of sides and or the size of angles you should measure?



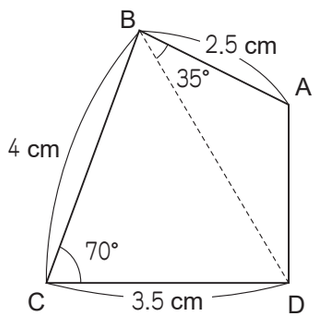
Set A: Side CD, AB, BC, and AD
Set B: Side CD, angle D, AD, AB, and BC

Example 2 Draw a quadrilateral that is congruent to the quadrilateral shown below.

1



2



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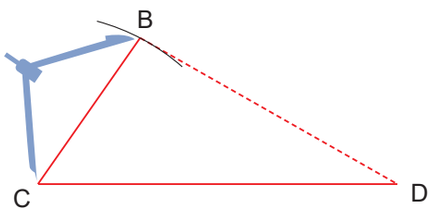
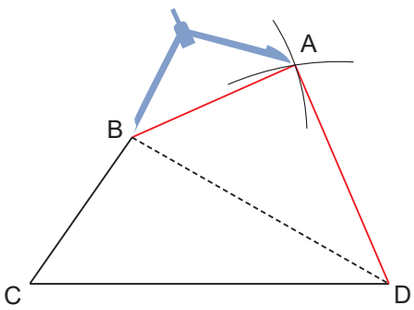
1

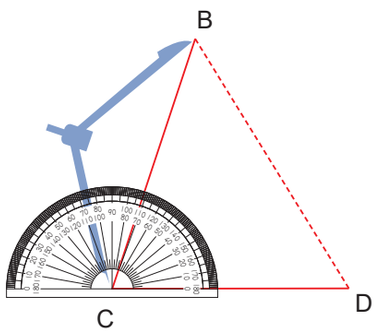
Determine the position of vertex B and draw BCD like drawing a congruent triangle by measuring the length of the 3 sides.	Draw ABD like drawing a congruent triangle by measuring the length of the 3 sides.

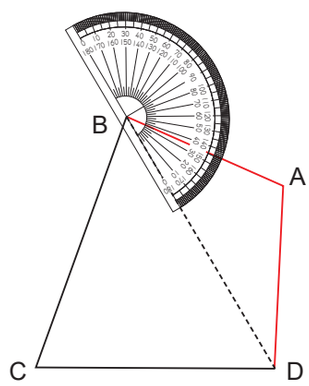




2

Determine the position of vertex B and draw BCD like drawing a congruent triangle by Measure the size of angle C and the length of side CB.	Determine the position of vertex A and draw ABD like drawing a congruent triangle by measuring the size of angle ABD and the length of side BA.

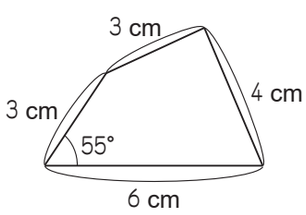




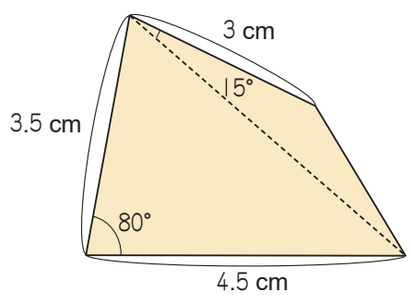
Congruent quadrilaterals can be drawn by using congruent triangles if the quadrilateral is divided into two triangles on a diagonal.

2 Draw a quadrilateral that is congruent to the quadrilateral shown or described below.

1



2



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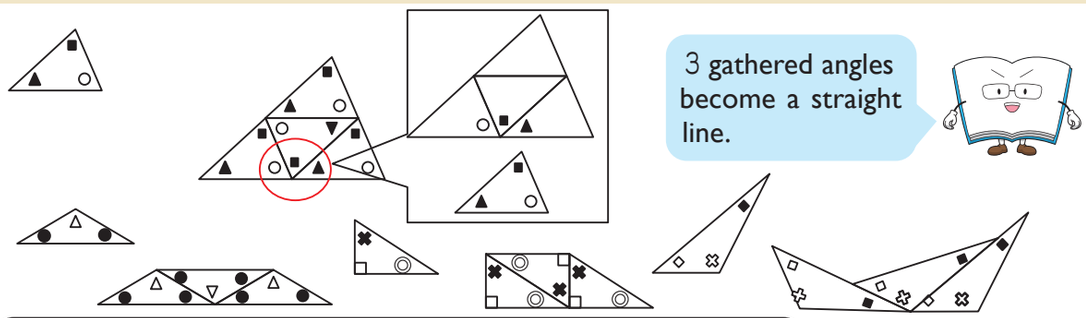
5 – 5 Congruent Figures

Angle of Figures

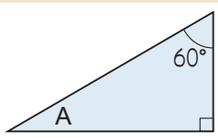
Instruction Making patterns using congruent triangles and quadrilaterals. Looking at the marked part below.



● For any triangle, the sum of the three angles is 180°.

Example 1 Find the size of the following labeled angles below.

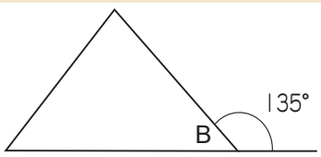
1



Math sentence $180 - (60 + 90) = 30$

Answer 30°

2

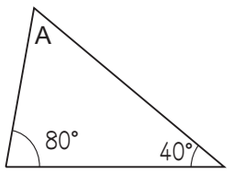


Math sentence $180 - 135 = 45$

Answer 45°

1 Find the size of the following labeled angles below.

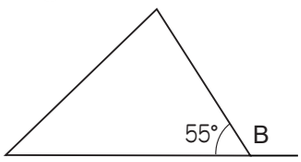
1



Math sentence

Answer _____

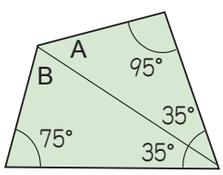
2



Math sentence

Answer _____

Example 2 Find the size of the following labeled angles below.



Math sentence $180 - (95 + 35) = 50$

$180 - (75 + 35) = 70$

$A = 50°$

$B = 70°$

The sum of all the angles are $(50 + 95 + 35) + (70 + 75 + 35) = 360°$. So, the sum of angles in a quadrilateral is 360°.

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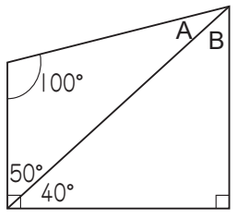
2 Find the size of the following labeled angles below.

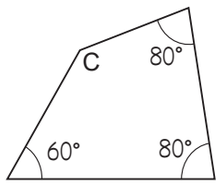
1



Math sentence

Answer _____

2



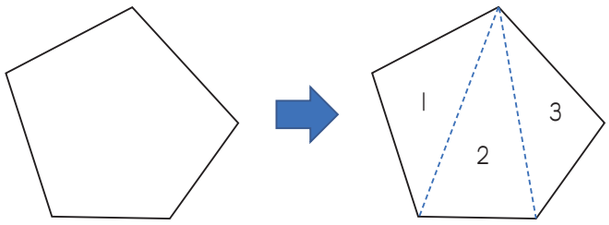
Math sentence

Answer _____

Even if you don't the divide quadrilateral into two triangles, since the sum of angles in a quadrilateral is 360°, you can find the angle.

Instruction

A figure enclosed by five straight lines is called a **pentagon**. Find the sum of the five angles of a pentagon.



If you draw straight lines from one vertex to a vertex that is not adjacent.

It can be divided into 3 triangles.

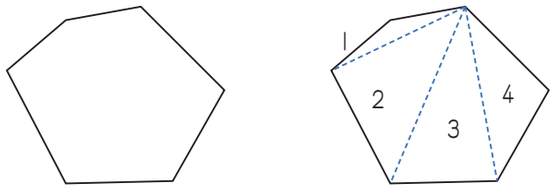
Therefore, the sum of the five angles of a pentagon is the sum of the three angles of three triangles.

$180 \times 3 = 540$ 540°

- For any pentagon, the sum of the three angles is 540° .

Example 2

A figure enclosed by six straight lines is called a **hexagon** Find the sum of the six angles of a hexagon.



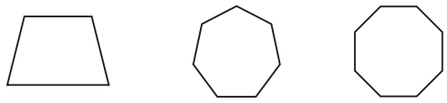
Math sentence $180 \times 4 = 720$

Answer 720°

- A figure that is enclosed only by straight lines, such as triangles, quadrilaterals, pentagons, hexagons is called a **polygon**.
- Each straight line connects any two vertices that are not adjacent is called a diagonal.

2 Complete the table below.

	Triangle	Quadrilateral	**Heptagon**	**Octagon**
Number of triangles	1			
Sum of the angles	180°			



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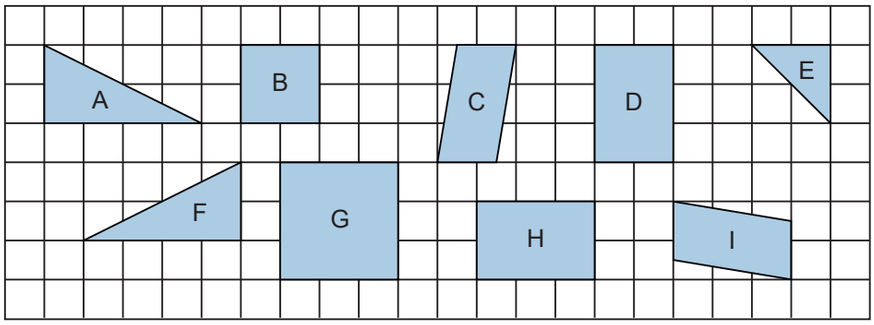
5 – 6 Congruent Figures

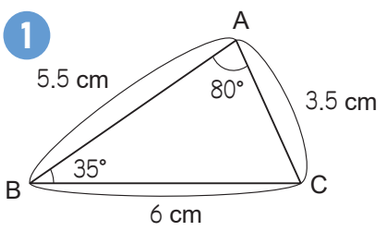
Review

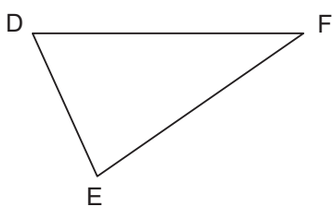
1 Find pairs of the congruent figures.



2 The following figures are congruent. Answer the following questions.

1





(a) Which is the corresponding vertex to vertex F?

Vertex [ ]

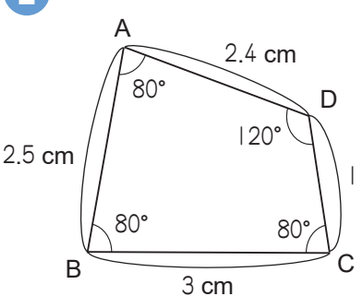
(b) Which is the corresponding angle to angle E? How many degrees is it?

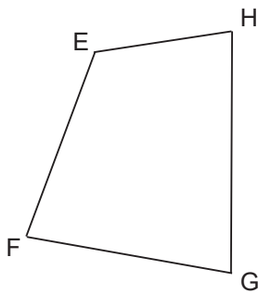
Angle [ ] Size [ ]

(c) Which is the corresponding side to side EF? How many cm long is it?

Side [ ] Length [ ]

2





(a) Which is the corresponding vertex to vertex E?

Vertex [ ]

(b) Which is the corresponding angle to angle H? How many degrees is it?

Angle [ ] Size [ ]

(c) Which is the corresponding side to side FG? How many cm long is it?

Side [ ] Length [ ]

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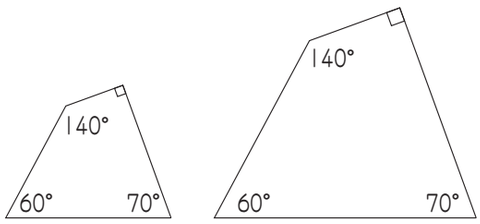
3 The following quadrilaterals are not congruent. Choose the appropriate reason from the followings.



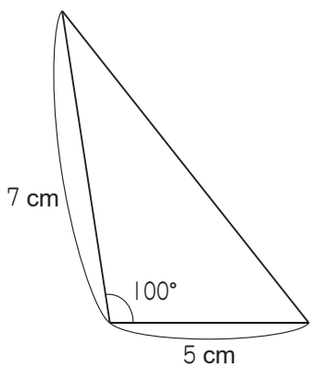
A | The two figures can't overlap completely.

B | All the size of angles are the same.

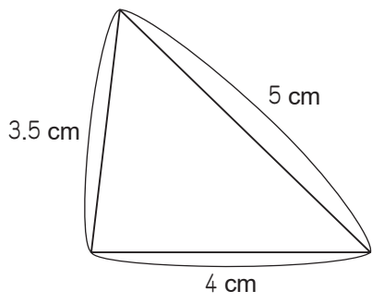
Answer ☐

4 Draw a triangle that is congruent to the triangle shown or described below.

1



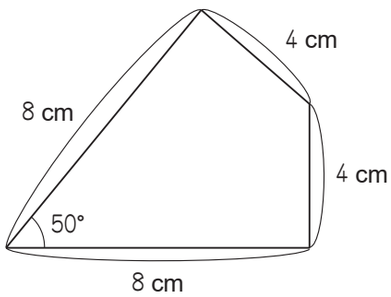
2



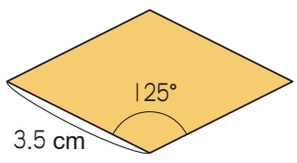
3 Triangle with two angles of 45° and 60°. The side in between with 6 cm.

5 Draw a quadrilateral that is congruent to the quadrilateral shown or described below.

1



2 A rhombus



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