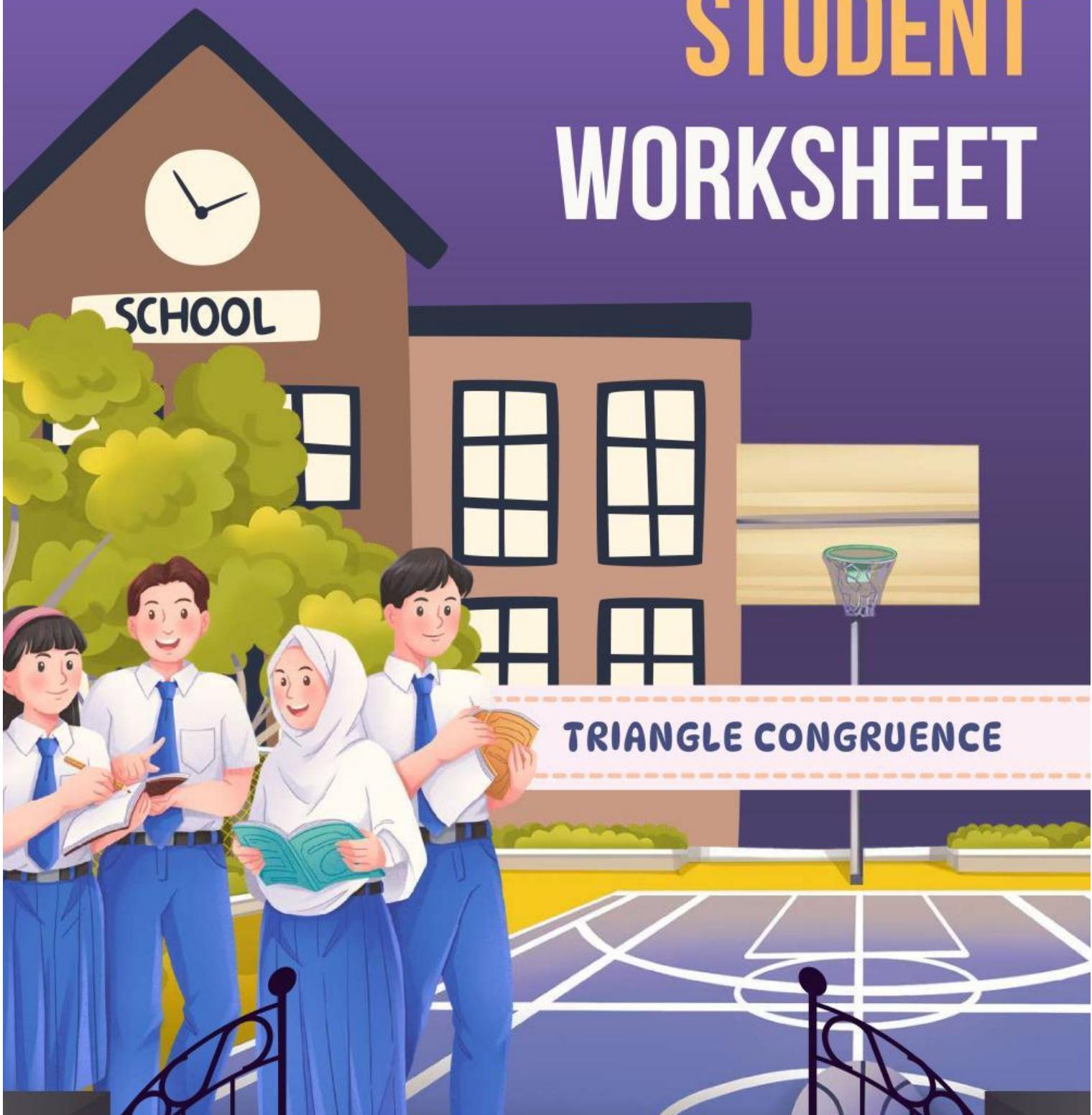# STUDENT
WORKSHEET

SCHOOL

TRIANGLE CONGRUENCE

Name : _____

Class : _____

OBJECTIVE

1. Demonstrate a finding of the concept of triangle congruence.
2. Determine whether two or more triangles are congruent by identifying and applying the appropriate congruence criteria.
3. Solve for unknown sides or angles in two or more congruent triangles using congruence relationships.

Activity 1.1 (Think)

Think about how to carry out Activity 1 individually; complete it in your notebook as follows.

Let's explore!

Tools and Materials Needed:
- Scissors
- Ruler
- Protractor

Exploration 1

1. Measure the length of each side and the measure of each angle on the triangle diagram below.
2. Carefully cut out the triangles as shown in the picture below, which is provided on the last page, following the printed lines.
3. Place △A1 on top of △A2.
4. Try stacking them in different ways (rotate, flip).
5. Observe and note what happens.
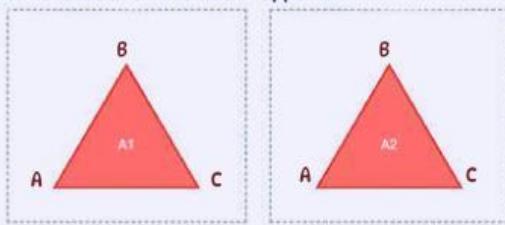
1. Do all parts of the triangles completely overlap each other?

2. Which parts must be the same for the two triangles to completely overlap?

Exploration 2

1. Measure the length of each side and the measure of each angle on the triangle diagram below.
2. Carefully cut out △B1 and △B2 as shown in the diagram below, which is provided on the last page (note that they have different orientations).
3. Try placing △B1 on top of △B2.
4. Can they still overlap perfectly? In how many different ways?
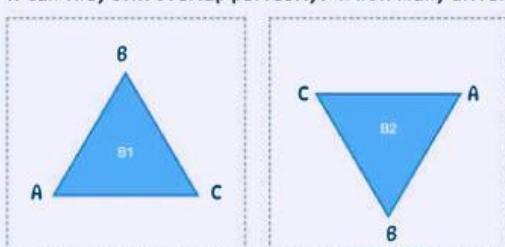
3. Although their positions are different, do △B1 and △B2 have the same measurements?

4. What is your conclusion about the orientation (direction) of a triangle in relation to having the same size?

Exploration 3

1. Measure the length of each side and the measure of each angle on the triangle diagram below.
2. Carefully cut out △C1 and △C2 as shown in the diagram below, which is provided on the last page
3. Try placing them on top of each other.
4. What is different between them?
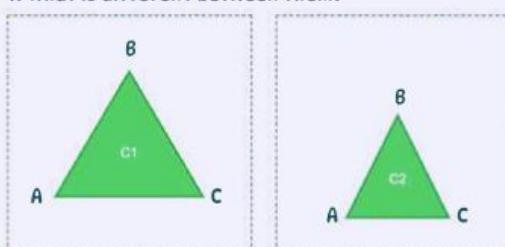
5. Do △C1 and △C2 completely overlap each other? Why or why not?

6. What is the difference between the pair of triangles △A and △B in Activities 1 and 2 and the pair of triangles △C in Activity 3?

Axploration 4

Now, record your observations in the table regarding the side lengths and angle measures of the triangles you have cut out.
Complete the following table!

Pair of triangles	Side Lenght (cm)			Angle Measure (...°)			Completely Overlapping?
	AB	BC	AC	∠ABC	∠BCA	∠CAB	
△A1							
△A2							
△B1							
△B2							
△C1							
△C2							

From the experiment, complete the following statements:

1. Two triangles are said to be congruent if
   ....!
2. If two triangles have three sides of equal length, then the two triangles are
   ....
3. If two triangles have two sides and the included angle equal in measure, then the two triangles are..
4. If two triangles have two angles and the included side equal in measure, then the two triangles are ....

Based on your experiment, write in your own words the conclusion:
What are two congruent triangles?

Think about how to carry out Activity 1.2 individually;
complete it in your notebook as follows.

Problem A

1. Draw the pair of triangles △ABC and △DEF with the following measurements:
AB = 4 cm; AC = 3 cm; BC = 2 cm; DE = 4 cm; DF = 3 cm; EF = 2 cm.

2. Measure the size of each angle in the triangles and fill in the following table:

Triangle Elements	△ABC	△DEF	Same/Not Same
Sides AB dan DE	.... cm	.... cm	....
Sides AC dan DF	.... cm	.... cm	....
Sides BC dan EF	.... cm	.... cm	....

3. Based on the information in (1) and (2), are triangles ABC and DEF congruent? Provide your reasoning.

....
....
....
....

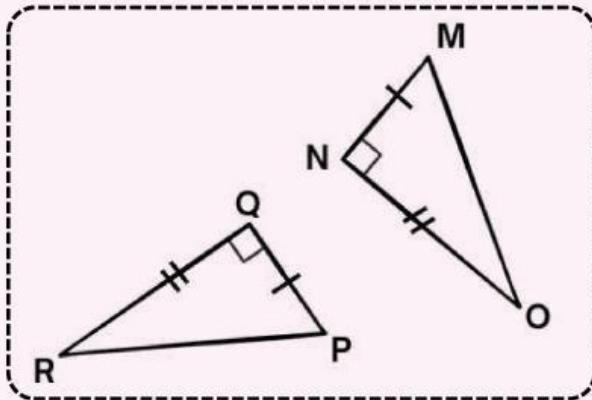4. What information is SUFFICIENT to determine that two triangles are congruent based on this observation?

Problem B

Observe the following provided diagram!

- Cut out the two triangles according to the image above, which is provided on the last page.
- Look again at the diagram above (before cutting), then complete the following blanks based on the information given in the diagram.

   a. Side PQ = Side ....., because they have the same symbol "/".
   b. Side QR = Side ....., because they have the same symbol "//".
   c. ∠PQR is the angle included between sides PQ and QR,
      while ∠..... is the angle included between sides MN and ..... .
   d. ∠PQR = ∠....., because they have the same symbol "L"

- Place the cut-out triangles KLM and XYZ on top of each other (or vice versa) so that they coincide perfectly.
- When △KLM and △XYZ are stacked and coincide perfectly, does your answer in step 2 match the result?

  ....

- To verify your answers, measure the corresponding angles and side lengths of both triangles. Record your results in the table below, then mark each row with a check.

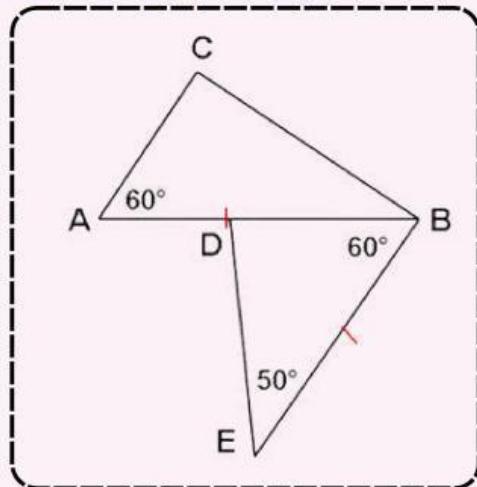| Angle Measure (...°)		Are they		Side Lenght (cm)		Apakah	
		Same	Not Same			Same	Not Same
PQR= .... °	MNO = ...°			PQ= ....cm	MN= ....cm		
				QR= ....cm	NO= ....cm		

- What information is SUFFICIENT to determine that two triangles are congruent based on this observation?

Problem C

PObserve the following provided diagram!

1. Cut out the two triangles following the pattern according to the image above, which is provided on the last page.

2. After you cut it out, two triangles will be formed.

3. Place the cut-out triangle △ABC on top of △BED (or vice versa) so that they coincide exactly.

4. When △ABC and △BED are stacked and coincide,
   Are there any corresponding sides and angles?

To answer step 4, complete the following blanks based on the information provided in the diagram.

a. $\angle CAB = \angle ..... = 60°$

b. $\angle ..... = \angle BED = 50°$

c. AB is the side located between $\angle CAB$ and $\angle .....$

d. BE is the side located between $\angle .....$ and $\angle BED$.

e. The sides marked with the same symbol are sides AB and ...., with lengths AB = ... = ...cm.

Triangle Elements	△ABC	△BED	Same/Not Same
Sides AB dan BE	.... cm	.... cm	....
$\angle CAB$ dan $\angle DBE$	.... °	.... °	....
$\angle ABC$ dan $\angle BED$	.... °	.... °	....

5. Based on the information in step (4), are triangles ABC and BED congruent? Provide your reasoning!

....

....

....

6. What information is SUFFICIENT to determine that two triangles are congruent based on this observation?

CONCLUSION

From problems A, B, and C, what can you conclude about the conditions for triangle congruence?

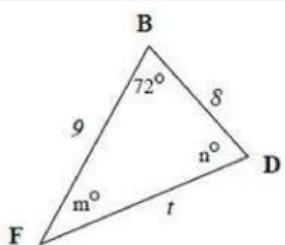**Conditions for triangle congruence**

1. ....
....
2. ....
....
3. ....
....

Use the conclusion about the conditions for triangle congruence to solve the following problems:

Let's Think Critically

Observe the following diagram!

Triangel 1

Triangel 2
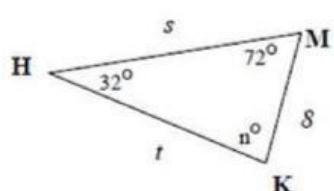
Solve the following problems by observing the diagram above.

1. Are △BDF and △MKH congruent? Explain your answer!
2. Determine the values of m, n, and s!

Discuss the results of your work for Activity 1 with your group!

LET'S STUDY ??
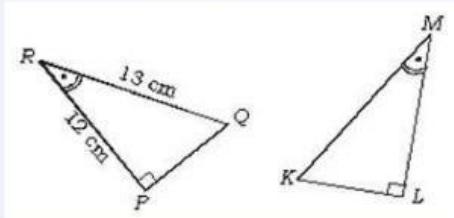
Based on your group discussion, individually write the answers to each problem in Activity 1 on the provided worksheet, and then solve the problems below!
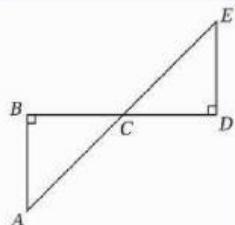
1. The following diagram shows that $\triangle PQR \cong \triangle KLM$ and $\angle PQR = 60°$
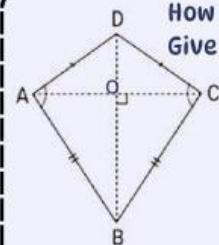

Determine the following:
- a. $\angle PRQ$
- b. $\angle LKM$
- c. $\angle KML$
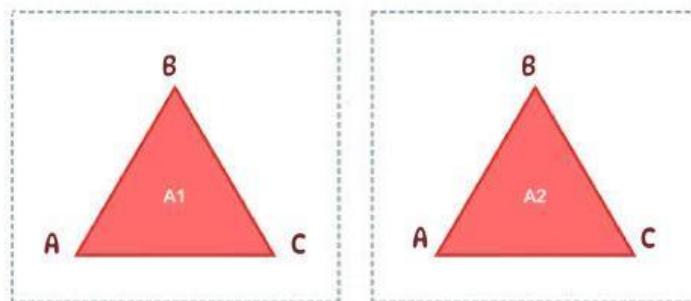- d. Length of side KL
- e. Length of side LM

2. Observe the following diagram!

Given $\triangle ABC \cong \triangle EDC$. If side ED = 4 cm and side BC is ¾ of the length of side ED, What is the length of BD? Provide your reasoning!

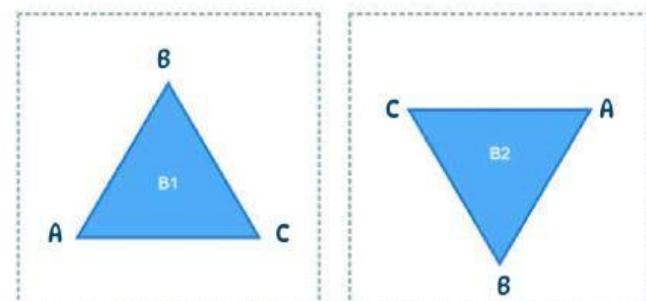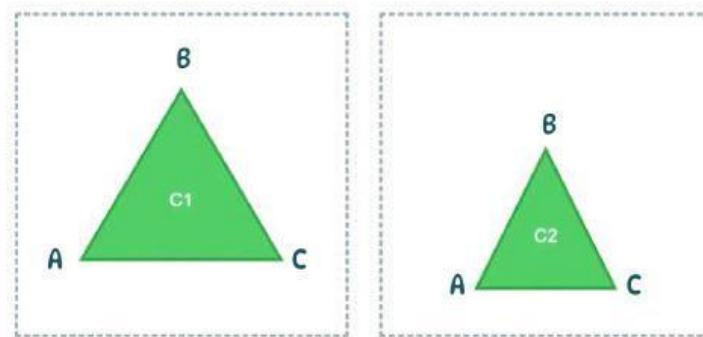How many pairs of congruent triangles are there in the figure on the right? Give your reasons!
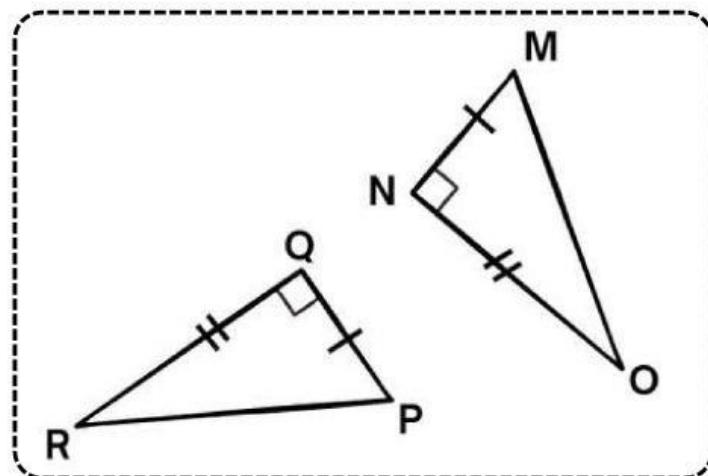
Exploration 1

Exploration 2

Exploration 3

Activity 1.2

Problem B

Problem C