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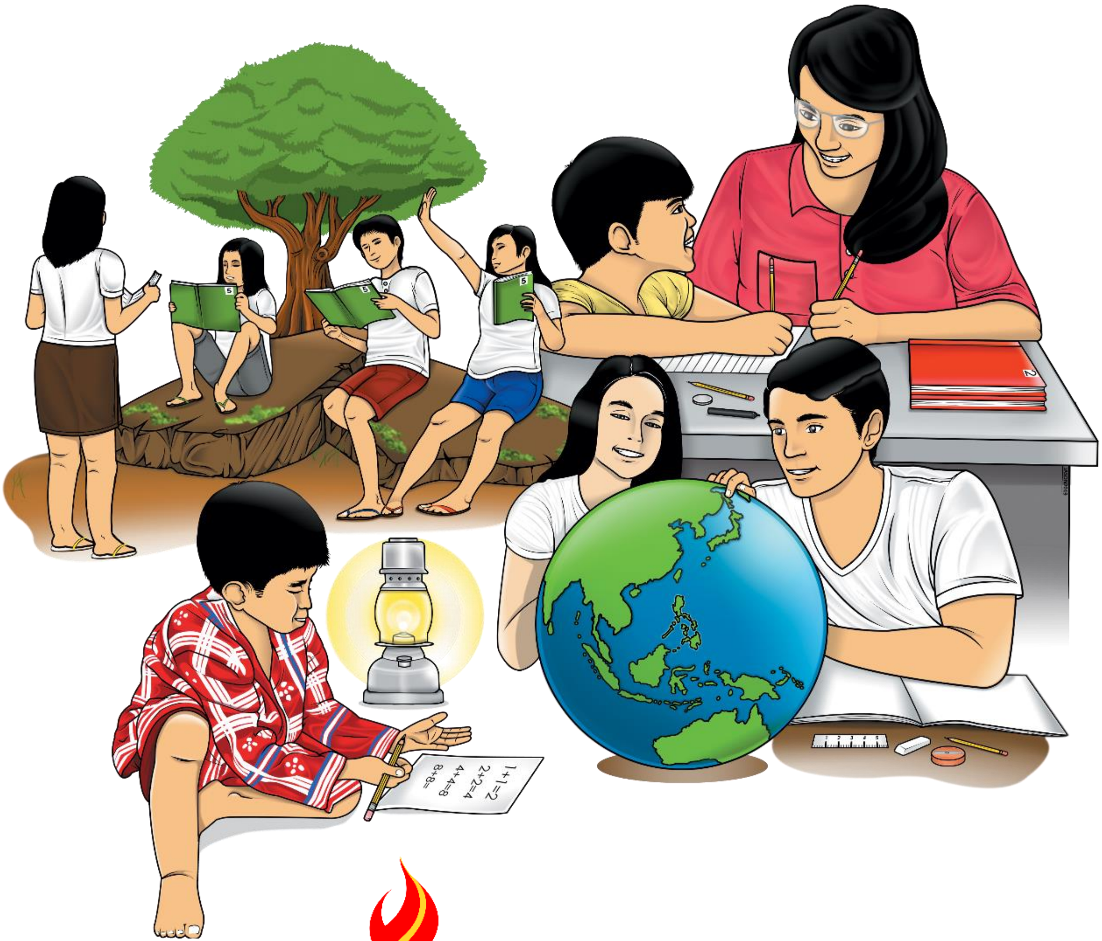
DEPARTMENT OF EDUCATION

Mathematics

Quarter 3 – Module 8:
Applying Triangle Congruence to Construct Perpendicular Lines and Angle Bisectors



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Mathematics

Quarter 3 – Module 8:
Applying Triangle Congruence to Construct Perpendicular Lines and Angle Bisectors

DEPARTMENT OF EDUCATION

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

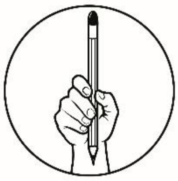
This module was designed and written with you in mind. It is here to help you apply triangle congruence to construct perpendicular lines and angle bisectors. You are provided with varied activities to process the knowledge and skills learned and to deepen and transfer your understanding of the lesson. The scope of this module enables you to use it in many different learning situations. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module contains:

- Lesson 1- Applying Triangle Congruence to Construct Perpendicular Lines and Angle Bisectors

After going through this module, you are expected to:

1. use triangle congruence to construct perpendicular lines and angle bisector; and
2. relate perpendicular lines and angle bisectors in real life setting.



What I Know

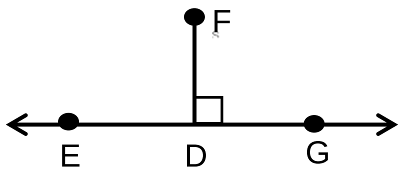
Pre-Assessment:

Directions: Read and answer each of the following items accurately. Write the letter of the correct answer on your answer sheet.

1) How many line/s is/are needed to bisect a given angle?
   A. four B. one C. three D. two

2) What do you call the line, ray or segment that divides the angle into two congruent parts?
   A. Midpoint
   B. Betweenness
   C. Angle Bisector
   D. Segment Bisector

Use the figure below to answer the items 3 – 6.



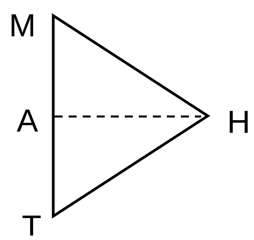
3) Which of the following is true about the figure above?
   A. $\overline{ED} \perp \overline{DG}$
   B. $\overline{FG} \perp \overline{EG}$
   C. $\overline{FD} \perp \overline{EG}$
   D. $\overline{GE} \perp \overline{EF}$

4) If we connect points F and E and points F and G, what figure is formed?
   A. Kite
   B. Rhombus
   C. Square
   D. Triangle

5) After connecting the said points in item 4, what is the common side that divides the figure into two parts?
   A. $\overline{ED}$ B. $\overline{EG}$ C. $\overline{DG}$ D. $\overline{FD}$

6) What do you call the lines that intersect and form a right angle?
   A. intersecting
   B. parallel
   C. perpendicular
   D. skew

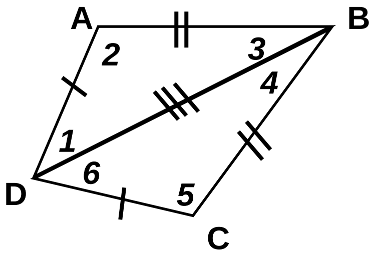
For items **7 – 8,** use $\triangle MHT$ at the right:
Given: $\overline{HA}$ *is the perpendicular bisector of* $\overline{MT}$



7) Which of the following angles are congruent?
   A. $\angle MAH$ and $\angle TAH$
   B. $\angle AHT$ and $\angle AMH$
   C. $\angle AHT$ and $\angle HTA$
   D. $\angle HAM$ and $\angle THA$

8) Which postulate or theorem justifies $\Delta MHA \cong \Delta THA$?
A. AAS B. ASA C. LL D. SSS

For items **9 – 15**, use the figure below to answer the questions that follow.



9) What triangle congruence postulate/theorem is illustrated by the figure above?
A. ASA B. HyA C. HyL D.SSS

10) What is the common side of $\Delta ABD\ and\ \Delta CBD$?
A. $\overline{AB}$ B. $\overline{BC}$ C. $\overline{BD}$ D. $\overline{CD}$

11) Which of the following is the set of correct statements of congruence of the corresponding sides?
A. $\overline{AD} \cong \overline{CD}$, $\overline{AB} \cong \overline{CB},\ and\ \overline{BD} \cong \overline{BD}$.
B. $\overline{AD} \cong \overline{AB}$, $\overline{AB} \cong \overline{CB}, and\ \overline{BD} \cong \overline{BD}$.
C. $\overline{AD} \cong \overline{BD}$, $\overline{AB} \cong \overline{CB},\ and\ \overline{BD} \cong \overline{CD}$.
D. $\overline{AD} \cong \overline{CD}$, $\overline{BD} \cong \overline{CB}, and\ \overline{BD} \cong \overline{AB}$.

12) Which of the following is the set of correct statements of congruence of the corresponding angles?
A. $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, and $\angle 5 \cong \angle 6$.
B. $\angle 1 \cong \angle 3$, $\angle 2 \cong \angle 4$, and $\angle 5 \cong \angle 6$.
C. $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 6$, and $\angle 3 \cong \angle 5$.
D. $\angle 1 \cong \angle 6$, $\angle 2\ a \cong \angle 5$, and $\angle 3 \cong \angle 4$.

13) Which of the following pairs are adjacent angles?
A. $\angle 1\ and \angle 2$
B. $\angle 1\ and \angle 3$
C. $\angle 1\ and\ \angle 5$
D. $\angle 1\ and\ \angle 6$

14) Which of the following describes the adjacent angles in the given figure above?
A. Congruent and are both right angles.
B. Congruent and are supplementary angles.
C. Congruent and are complementary angles.
D. Congruent and are corresponding angles of the congruent triangles.

15) If $\overline{BD}$ bisects $\angle ADC$, then which one describes the angles formed?
A. Two congruent acute angles
B. Two congruent right angles
C. Two congruent obtuse angles
D. Two congruent reflex angles

Lesson 1 Applying Triangle Congruence to Construct Perpendicular Lines and Angle Bisectors

Flying kites is a summer activity that is loved by almost everyone. It offers adventure, enjoyment, and awaken the child within every one of us at low cost. If you were to join in a kite festival, what features of your kite will you consider to ensure its smooth and stable flight and eventually win?

There are things to consider in making a kite especially the principle of balance. This is an application of triangle congruence, perpendicular lines, and angle bisectors which is the focus of this lesson.

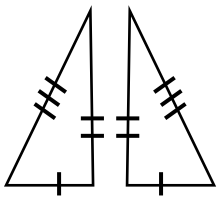
Start this lesson by recalling the triangle congruence postulates and theorems.

What's In

Activity: Remember Me!

Directions: Identify the congruence postulate or theorem that can be used to prove the congruence of the triangles in every pair. Choose the correct answer from the box below and write it on a separate sheet of paper.

AAS Theorem	ASA Postulate	Hypotenuse-Acute Theorem
Leg-Acute Theorem	SAS Postulate	Hypotenuse-Leg Theorem
Leg-Leg Theorem	SSS Postulate	

1.


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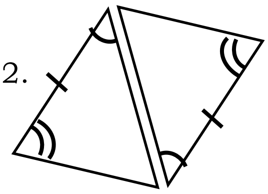

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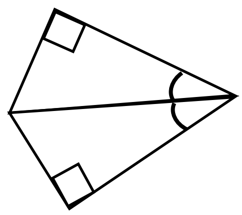

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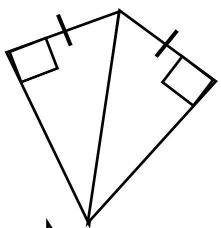

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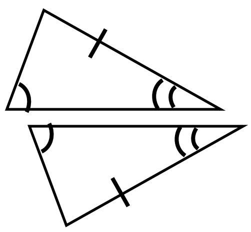

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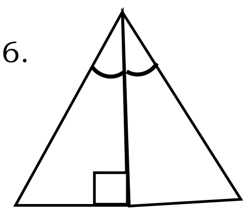

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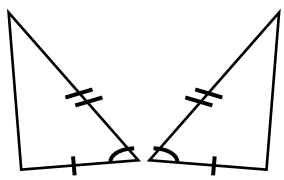

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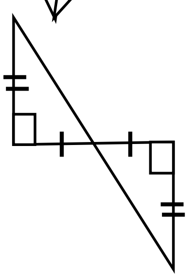
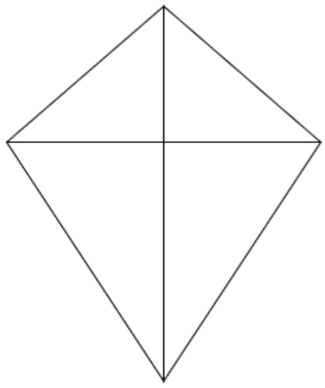


Questions:
1. How did you identify the congruence postulate or theorem to be used to prove that the pair of triangles are congruent?
2. When can you say that two triangles are congruent?

What's New

Directions: Read the situation below and answer the questions that follow.

Situation: Suppose you will make a kite that looks like the one below.



Questions:

1) What do you think will happen if the right part of the kite is bigger or smaller than its left part?
2) Is it necessary that the right and left parts of the kite are balanced?
3) What will you do to make sure that these parts of the kite are balanced?
4) Which corresponding sides of the kite should be made congruent?
5) Generally, what should be considered in order to have a good kite?

What is It

The activity in the previous section talks about the application of triangle congruence and the importance of angle bisectors. Here, you will learn how to use triangle congruence in forming angle bisectors and perpendicular lines.

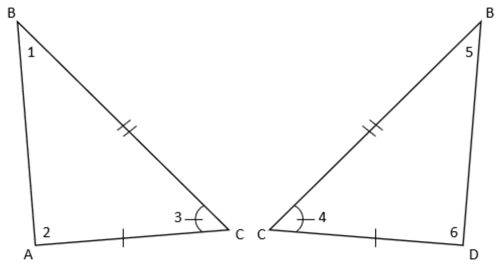
Let's start this discussion with the following:

A. Construction of angle bisector using two congruent triangles

Example 1:

Steps:

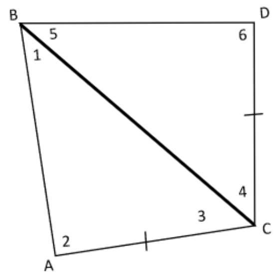
1. Given two congruent triangles by SAS Postulate, determine the other corresponding parts that are congruent.



Using Corresponding Parts of Congruent Triangles are Congruent (CPCTC), the following corresponding parts are congruent.

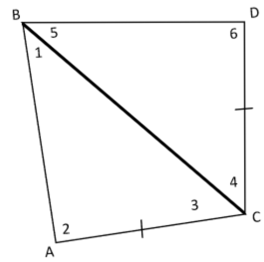
$\angle 1 \cong \angle 5$ $\angle 2 \cong \angle 6$ $\overline{AB} \cong \overline{DB}$

2. Put the two triangles together in such a way that a pair of corresponding sides coincide. See the thicker line.



3. Determine the common side or the side shared by the triangles.

   Common side: $\overline{BC}$

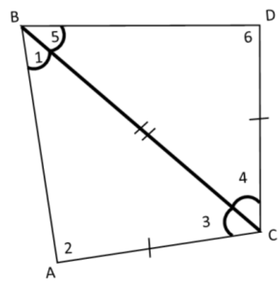


4. Determine the adjacent angles formed

   Adjacent angles:

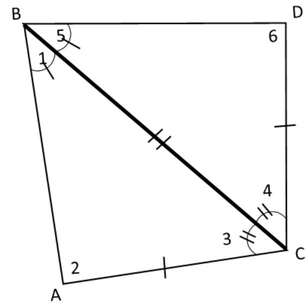
   Pair 1: $\angle 1$ and $\angle 5$

   Pair 2: $\angle 3$ and $\angle 4$

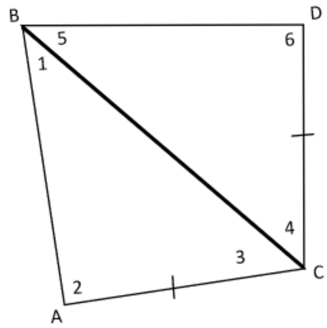


5. Determine the relationship of the adjacent angles.

   The two pairs of adjacent angles are congruent as they are corresponding parts of the congruent triangles.



6. Determine the relationship of any one of adjacent angles to the sum of their measures.



$$m\angle 1 = m\angle 5$$
$$m\angle ABD = m\angle 1 + m\angle 5$$
$$m\angle ABD = m\angle 1 + m\angle 1$$
$$m\angle ABD = 2(m\angle 1)$$
$$m\angle 1 = \tfrac{1}{2}(m\angle ABD)$$

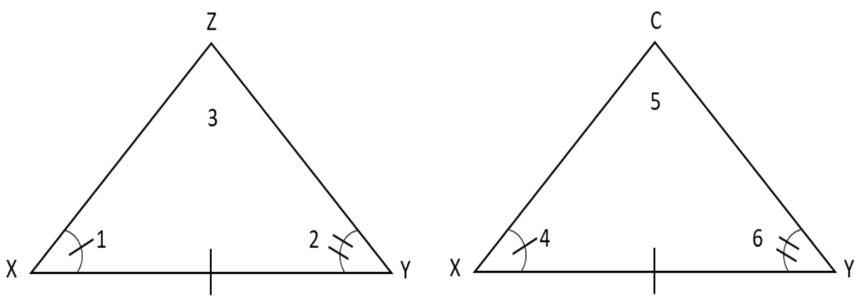
$$m\angle 3 = m\angle 4$$
$$m\angle ACD = m\angle 3 + m\angle 4$$
$$m\angle ACD = m\angle 3 + m\angle 3$$
$$m\angle ACD = 2(m\angle 3)$$
$$m\angle 3 = \tfrac{1}{2}(m\angle ACD)$$

Thus, one of the adjacent angles is half of the whole angle. Since the two adjacent angles are congruent and one of the angles is half of $\angle ABD$ or half of $\angle ACD$, it follows then that side BC divides both $\angle ABD$ and $\angle ACD$ congruently. Thus, $\overline{BC}$ bisects both $\angle ABD$ and $\angle ACD$. Hence, $\overline{BC}$ is an angle bisector.

Example 2:

Steps:

1. Given two congruent triangles by ASA Postulate, determine the other corresponding parts that are congruent.

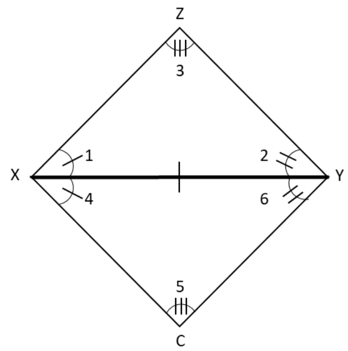


   Using Corresponding Parts of Congruent Triangles are Congruent (CPCTC), the following corresponding parts are congruent.

   $\angle 3 \cong \angle 5$;
   $\overline{XZ} \cong \overline{XC}$; and
   $\overline{YZ} \cong \overline{YC}$

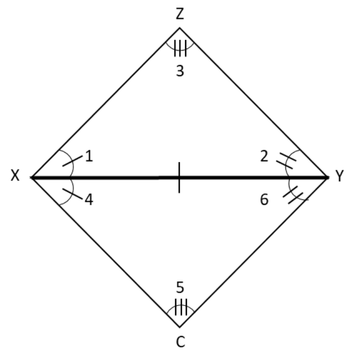
2. Put the two triangles together in such a way that a pair of corresponding sides coincide. Change the label of the overlapping sides.

   See the thicker line.



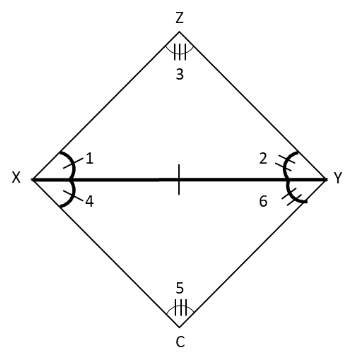
3. Determine the common side or the side shared by the triangles.

   Common side: $\overline{XY}$



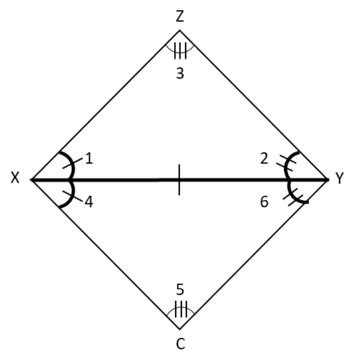
4. Determine the adjacent angles formed.

   Adjacent angles: $\angle 1$ and $\angle 4$; $\angle 2$ and $\angle 6$



5. Determine the relationship of the adjacent angles.

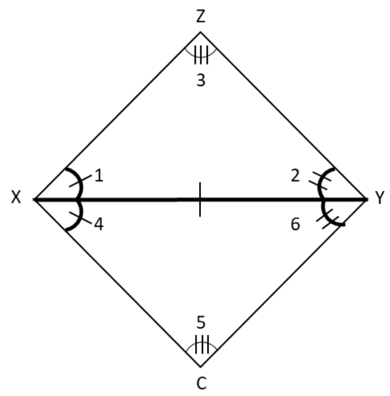
   The adjacent angles are congruent as they are corresponding parts of the congruent triangles.



6. Determine the relationship of any one of adjacent angles to the sum of their measures.

$$m\angle 1 = m\angle 4$$
$$m\angle ZXC = m\angle 1 + m\angle 4$$
$$m\angle ZXC = m\angle 1 + m\angle 1$$
$$m\angle ZXC = 2(m\angle 1)$$
$$m\angle 1 = \tfrac{1}{2}(m\angle ZXC)$$

$$m\angle 2 = m\angle 6$$
$$m\angle ZYC = m\angle 2 + m\angle 6$$
$$m\angle ZYC = m\angle 2 + m\angle 6$$
$$m\angle ZYC = 2(m\angle 2)$$
$$m\angle 2 = \tfrac{1}{2}(m\angle ZYC)$$



Thus, one of the adjacent angles is half of the whole angle.

Since the two pairs of adjacent angles are congruent and one of the angles is half of $\angle ZXC$ or half of $\angle ZYC$, it follows that side $\overline{XY}$ divides both $\angle ZXC$ and $\angle ZYC$ congruently. Thus, side $\overline{XY}$ bisects both $\angle ZXC$ and $\angle ZYC$. Hence, side $\overline{XY}$ is an angle bisector.

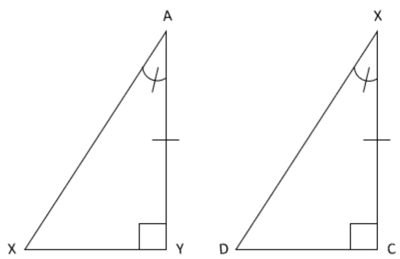
An ***angle bisector*** is a line, ray, or segment that divides the angle into two congruent angles.

B. Constructing Perpendicular lines using two congruent right triangles

Example 1

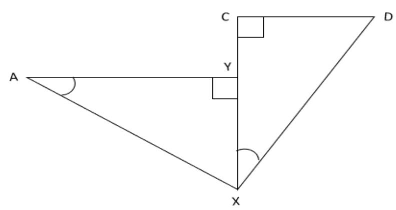
Steps:

1. Given two congruent right triangles by LA Theorem, determine the other corresponding parts that are congruent.

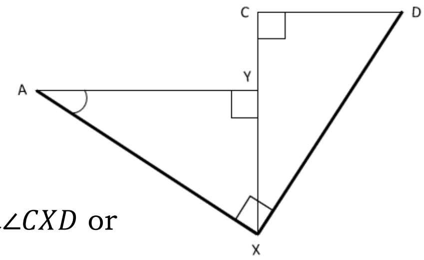


Using Corresponding Parts of Congruent Triangles are Congruent (CPCTC), the following corresponding parts are congruent.
$\angle AXY \cong \angle XDC$ $\overline{AX} \cong \overline{XD}$ $\overline{YX} \cong \overline{CD}$

2. Put the two triangles side by side in such a way that the vertices labeled with X coincide.



3. Determine the relationship of $\angle AXY$ and $\angle CXD$



$$m\angle A + m\angle AXY + m\angle AYX = 180°$$
$$m\angle A + m\angle AXY + 90° = 180°$$
$$m\angle A + m\angle AXY = 180 - 90°$$
$$m\angle A + m\angle AXY = 90°$$
$$m\angle AXY = 90° - m\angle A$$

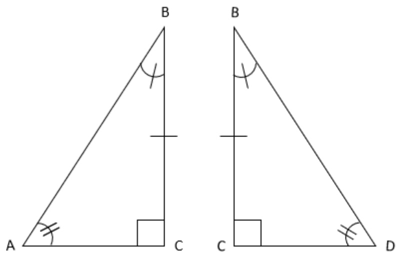
Since $\angle A \cong \angle CXD$, then $m\angle AXY = 90° - m\angle CXD$ or
$$m\angle AXY + m\angle CXD = 90°$$

Thus, $\angle AXY$ and $\angle CXD$ are complementary.

Since the sum of the measures of $\angle AXY$ and $\angle CXD$ is equal to 90 degrees, then $\overline{AX}$ is perpendicular to $\overline{XD}$, or $\overline{XD}$ is perpendicular to $\overline{AX}$ by definition of perpendicularity.

Example 2

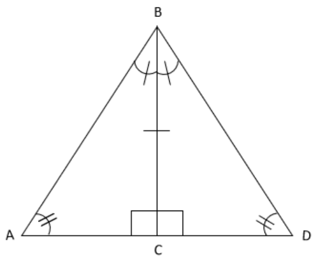
1. Given two congruent right triangles by LA Theorem, determine the other corresponding parts that are congruent



   Using Corresponding Parts of Congruent Triangles are Congruent (CPCTC), the following corresponding parts are congruent.

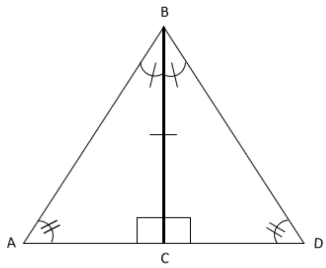
   $\overline{BA} \cong \overline{BD}$ and $\overline{AC} \cong \overline{DC}$

2. Put the two triangles side by side in such a way that a pair of corresponding sides coincide.



3. Determine the common side shared by the two triangles.

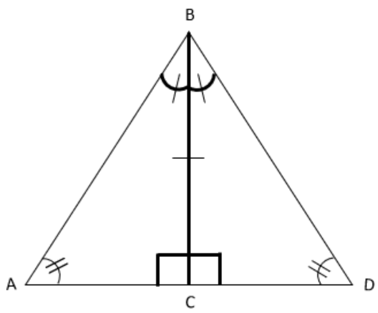
   Common Side: $\overline{BC}$



4. Determine the pairs of adjacent angles.

   Adjacent angles:

   Pair 1: $\angle ABC$ and $\angle DBC$
   Pair 2: $\angle ACB$ and $\angle DCB$



5. Determine the relationship of the adjacent angles.

   Pair1: $\angle ABC$ and $\angle DBC$ are congruent.
   Pair 2: $\angle ACB$ and $\angle DCB$ are congruent
   and at the same time both are right angles

6. Determining relationships
   A. Determine the relationship of the common side and the vertex angle.

      The common side is the angle bisector of the vertex angle since $\angle ABC \cong \angle DBC$.

   B. Determine the relationship of the common side and the base of the larger triangle.

      They are perpendicular lines since the angles formed, $\angle ACB$ and $\angle DCB$ are right angles.

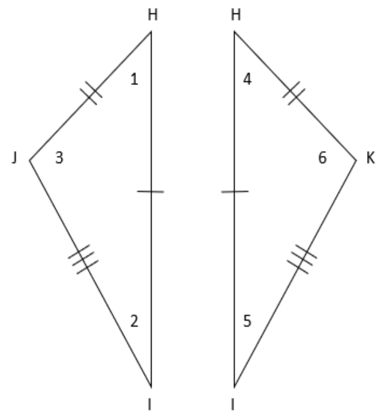
Perpendicular segments or lines *are segments or lines* that intersect at a common point forming 90 – degree angle.

What's More

Activity 1: Answer Me!

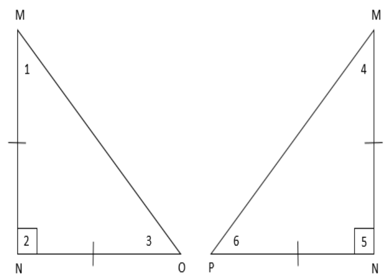
Directions: Use the given two congruent triangles to answer the questions that follow. Use a separate sheet of paper.

A. Given: $\Delta HJI \cong \Delta HKI$.



1. What triangle congruence postulate is illustrated in the figure?
2. What are the corresponding congruent sides?
3. What are the corresponding congruent angles?
4. If you put together the two triangles in such a way that side $\overline{HI}$ of ΔHJI coincides with the side $\overline{HI}$ of ΔHKI, what new figure is formed?
5. Do the sides of the two triangles that coincide appear to be congruent? Why?
6. What are the pairs of adjacent angles?
7. How are the adjacent angles related to each other?
8. What does $\overline{HI}$ do to $\angle JHK$ and $\angle JIK$?

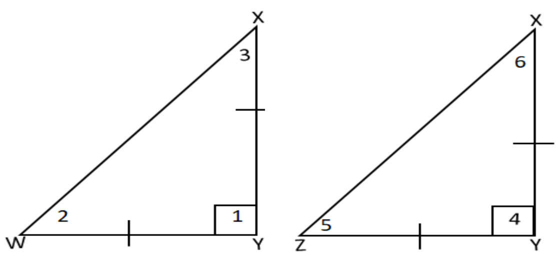
B. Given: $\Delta MNO \cong \Delta MNP$



1. What triangle congruence postulate is illustrated by the figure above?
2. What are the corresponding congruent sides?
3. What are the corresponding congruent angles?
4. If you put together the two triangles in such a way that $\overline{MN}$ of ΔMNO coincides with the $\overline{MN}$ of ΔMNP, what new figure is formed?
5. What is the common side shared by the two triangles?
6. What are the adjacent angles formed when the common side divides $\angle OMP$ which is the vertex angle?
7. Are these adjacent angles congruent? Why?
8. How will you describe the common side in relation to $\angle OMP$?
9. What are the adjacent angles formed when $\overline{MN}$ intersects with $\overline{OP}$?
10. Are these adjacent angles congruent? Why?
11. How are $\overline{MN}$ and $\overline{OP}$ related to each other?

What I Have Learned

Directions: Fill in the blank with the correct word/phrase which you can be chosen from the choices in the box below. Write your answer on a separate sheet of paper.



ΔWXZ	$\overline{XY}$	ΔXYZ
$\angle 1$ *and* $\angle 4$ $\angle 2$ *and* $\angle 5$ $\angle 3$ *and* $\angle 6$	90 degrees	they are corresponding parts of the congruent triangles
$\angle 1$ *and* $\angle 4$ $\angle 3$ *and* $\angle 6$	perpendicular bisector	$\angle XYW$ *and* $\angle XYZ$
bisects	$\overline{XY}$ *and* $\overline{XY}$ $\overline{WY}$ *and* $\overline{ZY}$	LL Theorem

I know that (1)____________ is the triangle congruence postulate that can be used to prove that $\triangle XYW \cong \triangle XYZ$. The corresponding congruent sides are (2)____________. The corresponding congruent angles are (3)____________. If I put together the two triangles in such a way that $\overline{XY}$ of $\triangle XYW$ coincides with $\overline{XY}$ of (4)____________, (5)____________ is formed. The common side shared by the two triangles is (6)____________. The adjacent angles formed when the common side divides $\angle WXZ$ are (7)____________. These adjacent angles are congruent because (8)____________. $\overline{XY}$ (9)____________ $\angle WXZ$, hence it is an angle bisector. The adjacent angles formed when the common side intersects $\overline{WZ}$ are (10)____________ which are both (11)____________ in measure. Because of this fact, it is rightful to call $\overline{XY}$ as ____________.

What I Can Do

Situation: Your barangay will hold a kite-making contest and submission of kite design is required. On a clean bond paper, draw the design of the kite that you want as an entry for the contest. The following rubric will be used to judge your kite design.

Rubrics:

Categories and Criteria	4 Good	3 Fair	2 Poor
Design	Geometry, Right Angles, and Symmetry are properly illustrated in the design.	Any two of geometry, right angles and symmetry are illustrated in the design.	None or only one of geometry, right angles, and symmetry is illustrated in the design.
Creativity	Design incorporates artistic elements, 100% functional, and 100% original.	Design is artistic, 50% functional, and 50% original.	Design is basic, 20% functional, and 20% original.

Assessment

Post-Assessment

Directions: Read and answer each of the following items accurately. Write the letter of the correct answer on your answer sheet of paper.

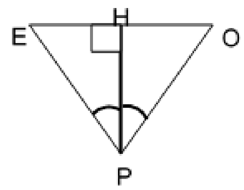
1) Which of the following is true about an angle bisector?

   A. It divides an angle into halves.
   B. It divides an angle at 45º.
   C. It divides an angle at 90º.
   D. It divides an angle into three parts.

2) What do you call the segments or lines that intersect forming a 90-degree angle?

   A. angle bisector
   B. auxiliary lines
   C. skew segments/lines
   D. perpendicular segments/lines

For items **3 – 7,** use the figure at the right to answer the questions that follow.



3) Which among the following theorems of triangle congruence can be used to prove that $\Delta HEP \cong \Delta HOP$?

   A. AAS B. HyA C. LA D.LL

4) What is the corresponding side of $\overline{OP}$?

   A. $\overline{EH}$ B. $\overline{EP}$ C. $\overline{HO}$ D. $\overline{HP}$

5) Which of the following is true about $\overline{PH}$?

   A. $\overline{PH}$ bisects $\angle EOP$
   B. $\overline{PH}$ bisects $\angle EPO$
   C. $\overline{PH}$ bisects $\angle PEO$
   D. $\overline{PH}$ bisects $\angle POE$

6) Which of the following reasons justifies $\overline{PH} \cong \overline{PH}$?

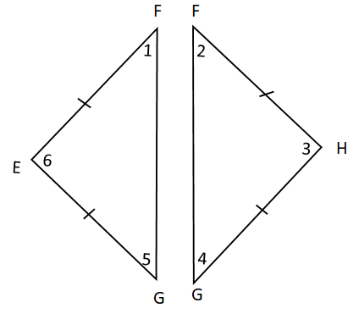
   A. Definition of congruent segments
   B. Definition of Perpendicular
   C. Reflexive Property
   D. Congruent Parts of Congruent Triangles are Congruent

7) What other information must be added in the figure above to prove $\triangle HEP \cong \triangle HOP$ by SAS Postulate?

   A. $\overline{EH} \cong \overline{EP}$
   B. $\overline{EP} \cong \overline{OP}$
   C. $\overline{OH} \cong \overline{EP}$
   D. $\overline{OH} \cong \overline{HP}$

For items **8 – 11**, use the figure at the right to answer the questions that follow.

8) When two triangles are put together in such a way that a pair of corresponding sides coincide, what figure is formed?



A. trapezoid
B. hexagon
C. square
D. triangle

9) In the resulting figure in item 8, what is the common side of the $\triangle EFG$ and $\triangle HFG$?

A. $\overline{EF}$ B. $\overline{EG}$ C. $\overline{FG}$ D. $\overline{FH}$

10) What postulate or theorem proves that $\triangle FEG \cong \triangle FHG$?

A. AAS B. SAS C. SSS D. ASA

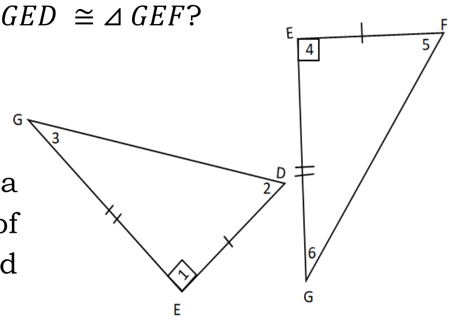
11) What is the relationship of $\angle 1$ and $\angle 2$?

A. They are congruent angles.
B. They are linear pair angles.
C. They are non-congruent angles
D. They are supplementary angles.

For items **12-15**, use the figure at the right to answer the questions that follow.

12) What postulate or theorem illustrates that $\triangle GED \cong \triangle GEF$?

A. ASA
B. HyA
C. HyL
D. LL



13) If you put together the two triangles in such a way that $\overline{GE}$ of $\triangle GED$ coincides with the $\overline{GE}$ of $\triangle GEF$, what are the adjacent angles formed when the common side divides $\angle DGF$?

A. $\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 6$
B. $\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 5$
C. $\angle 1$ and $\angle 4$, $\angle 2$ and $\angle 5$
D. $\angle 1$ and $\angle 4$, $\angle 3$ and $\angle 6$

14) If you put together the two triangles in such a way that $\overline{GE}$ of $\triangle GED$ coincides with the $\overline{GE}$ of $\triangle GEF$, which of the following is **NOT TRUE** about $\overline{GE}$ to $\angle DGF$?

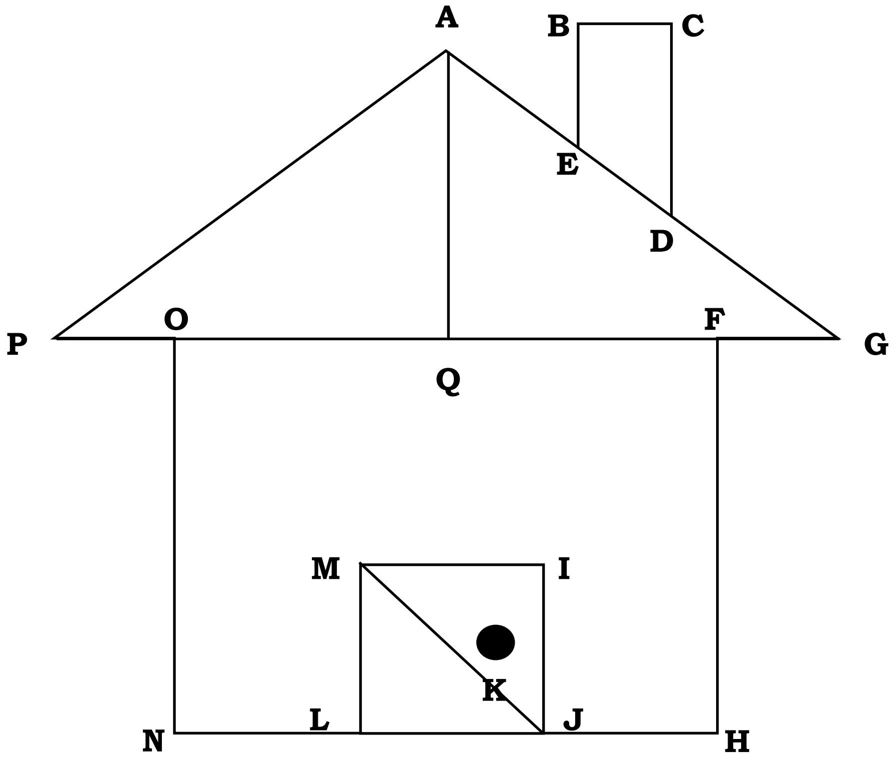
A. $\overline{GE}$ bisects $\angle DGF$
B. $\overline{GE}$ is in the exterior of $\angle DGF$
C. $\overline{GE}$ is in the interior of $\angle DGF$
D. $\overline{GE}$ is the angle bisector of $\angle DGF$

15) If you put together the two triangles in such a way that $\overline{GE}$ of $\triangle GED$ coincides with the $\overline{GE}$ of $\triangle GEF$, what is the relationship of $\overline{GE}$ and $\overline{DF}$?

A. $\overline{GE}$ bisects $\overline{DF}$
B. $\overline{GE}$ is congruent to $\overline{DF}$
C. $\overline{GE}$ do not lie in side $\overline{DF}$
D. $\overline{GE}$ is parallel to $\overline{DF}$

Additional Activities

Consider the simple house drawing with parts properly labeled and answer the questions that follow.



Questions:

1. Using a protractor, which parts of the house drawing are perpendicular segments?
2. How did you determine that the segments are perpendicular?
3. Using a protractor, which parts of the house are angle bisectors?
4. How did you determine that the segments are angle bisectors?
5. How important are perpendicular lines and angle bisectors in building a house?

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Answer Key

WHAT I KNOW

1) B
2) C
3) C
4) D
5) D
6) C
7) A
8) C
9) D
10) C
11) A
12) D
13) D
14) D
15) A

WHAT'S IN

1) SSS Postulate
2) ASA Postulate
3) Hypotenuse Acute Theorem
4) Hypotenuse-Leg Theorem
5) AAS Theorem
6) Leg-Acute Theorem
7) SAS Postulate
8) Leg-Leg Theorem

Guide Questions:

1) Through the use of markings.
2) Two triangles are congruent if the corresponding parts are congruent

WHAT'S NEW

1) The structure of the kite will not be balanced.
2) Yes
3) The left and right part of the kite must be equal.
4) The sides containing the upper part of the kite should be equal. The sides containing the lower part of the kite should be equal.
5) To have a good kite, it must have two pairs of equal length-sides that are adjacent to each other. Its diagonals must form a 90-degree angle.

WHAT'S MORE

Activity: Answer Me!

A.

1) SSS Congruence
2) $\overline{HJ} \cong \overline{HK}$, $\overline{JI} \cong \overline{KI}$, and $\overline{HI} \cong \overline{HI}$
3) $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 5$, and $\angle 3 \cong \angle 6$,
4) A kite/ kite HJIK
5) Yes because it is the common side.
6) $\angle 1 \cong \angle 4$ and $\angle 2 \cong \angle 5$
7) The pairs of adjacent angles are congruent as they are corresponding parts of congruent triangles.
8) $\overline{HI}$ bisects both $\angle JHK and \angle JIK$, hence $\overline{HI}$ is an angle bisector.

B.

1) LL Congruence Theorem
2) $\overline{MN} \cong \overline{MN}$, $\overline{NO} \cong \overline{NP}$
3) $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 5$, and $\angle 3 \cong \angle 6$
4) A triangle/ $\triangle MPO$
5) $\overline{MN}$
6) $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 5$,
7) Yes, because they are corresponding parts of the congruent triangles.
8) $\overline{MN}$ bisects $\angle OMP$, hence it is an angle bisector.
9) $\angle 2 \cong \angle 5$ or $\angle MNO \cong \angle MNP$
10) Yes, because they are both right angles.
11) $\overline{MN} \perp \overline{OP}$

WHAT I HAVE LEARNED

I know that **LL Theorem** is the triangle congruence postulate that can be used to prove $\triangle XYW \cong \triangle XYZ$. The congruent corresponding sides are $\overline{XY}$ ***and*** $\overline{XY}$ ***and*** $\overline{WY}$ ***and*** $\overline{ZY}$**.** The congruent corresponding angles are **$\angle 1$ *and* $\angle 4$, $\angle 2$ *and* $\angle 5$, and $\angle 3$ *and* $\angle 6$.** If I put together the two triangles in such a way that $\overline{XY}$ of $\triangle XYW$ coincides with $\overline{XY}$ of $\triangledown$ ***XYZ***, $\triangledown$ ***WXZ*** is formed. The common side shared by the two triangles is $\overline{\boldsymbol{XY}}$. The adjacent angles formed when the common side divides $\angle WXZ$ are **$\angle 1$ *and* $\angle 4$ and $\angle 3$ *and* $\angle 6$**. These adjacent angles are congruent because **they are corresponding parts of the congruent triangles**. $\overline{XY}$ ***bisects*** $\angle WXZ$, hence it is an angle bisector. The adjacent angles formed when the common side intersect $\overline{WZ}$ are ***$\angle XYW$ and $\angle XYZ$*** which are both **90 degrees** in measure. Because of this fact, it is rightful to call $\overline{WZ}$ as **perpendicular bisector.**

ASSESSMENT

1) A
2) D
3) C
4) B
5) B
6) C
7) B
8) C
9) C
10) C
11) A
12) D
13) D
14) B
15) A

ADDITIONAL ACTIVITIES

1) $\overline{AQ}$ and $\overline{PG}$, $\overline{EB}$ and $\overline{BC}$, $\overline{CD}$ and $\overline{BC}$, $\overline{NO}$ and $\overline{PO}$, $\overline{HF}$ and $\overline{FG}$, $\overline{NO}$ and $\overline{NH}$, $\overline{FH}$ and $\overline{NH}$, $\overline{ML}$ and $\overline{MI}$, $\overline{ML}$ and $\overline{LJ}$, $\overline{IJ}$ and $\overline{IM}$, $\overline{IJ}$ and $\overline{LJ}$
2) By the use of protractor and look for segment that form 90 degrees.
3) $\overline{MJ}$ and $\overline{AQ}$
4) By the use of protractor and look for segments that divide angles into two equal parts
5) (Answers will vary with students)

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