

Unit 6 Triangle Congruence

Target 6.1: Demonstrate knowledge of triangle facts

6.1a – Classify triangles by sides and angles

6.1b – Properties of isosceles triangles and equilateral triangles

6.1c – Construction of equilateral triangles and isosceles triangles

Target 6.2: Prove triangles congruent using Third Angles Theorem, SSS, HL, SAS, ASA, & AAS

6.2a – Apply Congruence and Triangle

6.2b – Prove Triangles Congruent by SSS and HL

6.2c – Prove Triangles Congruent by SAS, ASA, AAS

Date	Target	Assignment	Done!
F 12-4	6.1a/c	6.1 Day 1 Worksheet	
M 12-7	6.1b	6.1 Take Home Quiz	
T 12-8	6.2a	6.2a Worksheet	
W 12-9	6.2b	6.2b Worksheet	
R 12-10	6.2c	6.2 Take Home Quiz	
F 12-11	6.1-6.2	Unit 6 Review	
M 12-14	Test	Unit 6 Mini-Test	

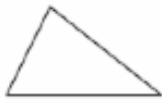


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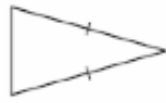
6.1a – Classify Triangles By Sides and Angles

Target 1: Demonstrate knowledge of triangle facts

Classifying Triangles by Sides



___ congruent
sides

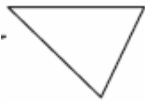


At least ___
congruent sides



___ congruent
sides

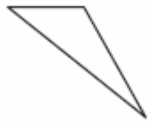
Classifying Triangles by Angles



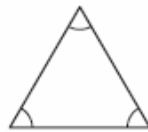
___ acute
angles



___ right
angle



___ obtuse
angle



___ congruent
angles

Example 1: Identify the type of triangle given the information

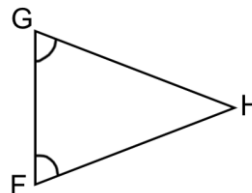
$m\angle B$ is 4 times $m\angle A$, and $m\angle A = 30^\circ$. What type of triangle is $\triangle ABC$? Sketch the triangle

YOU TRY NOW!

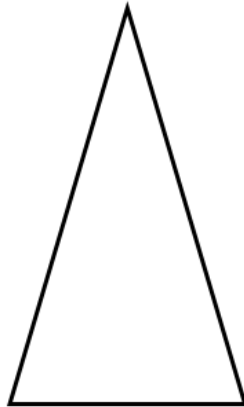
1. $m\angle R$ is 60° , $m\angle F$ is 30° , and $m\angle A = 20^\circ$ in a triangle. Which descriptions match this triangle? Choose all that apply.

- a) Right Triangle
- b) Obtuse Triangle
- c) Scalene Triangle
- d) Isosceles Triangle

2. The length of \overline{GH} is 11 inches. How long is \overline{FH} ?



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6.1b – Properties of Isosceles Triangles and Equilateral Triangles**Target 1: Demonstrate knowledge of triangle facts**Drawing with your teacher!Annotate Here**Base Angles Theorem**

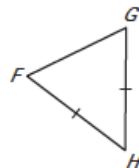
If two sides of a triangle are congruent, then the angles opposite them are congruent.

If $\overline{AB} \cong \overline{AC}$, then $\angle B \cong$ _____.

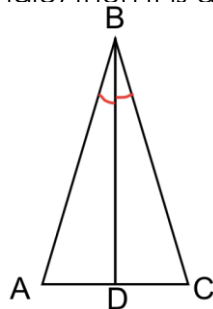
Converse of the Base Angles Theorem

If $\angle B \cong \angle C$, then $\overline{AB} \cong$ _____.

Example 1: In $\triangle FGH$, $\overline{FH} \cong \overline{GH}$. Name two congruent angles.

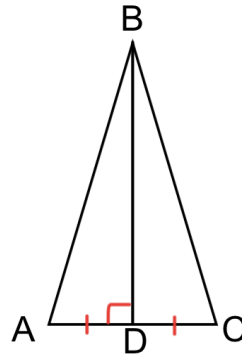
**Isosceles Bisector Theorem**

If a line bisects an isosceles triangle's vertex angle, then it is a perpendicular bisector of the base.



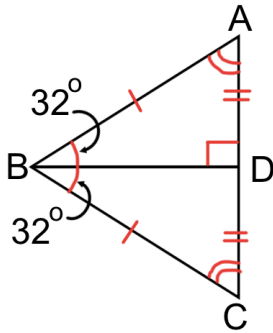
Isosceles Bisector Theorem Converse

If a line is a perpendicular bisector of an isosceles triangle's base, then it is also the angle bisector of the vertex angle.



Example 1: Use properties of the isosceles triangles

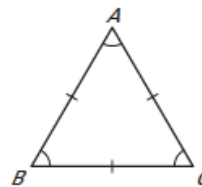
What is $m\angle A$?



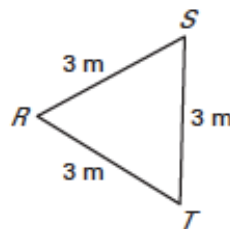
Equilateral Triangles

If a triangle is equilateral, then it is _____.

If a triangle is equiangular, then it is _____.



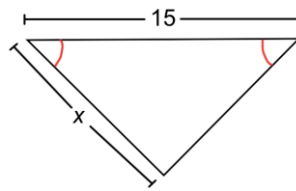
Example 2: Find the measures of $\angle R$, $\angle S$, and $\angle T$.



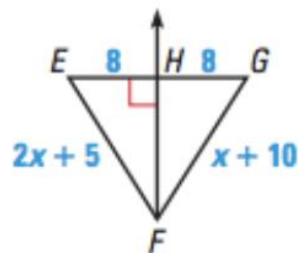
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YOU TRY NOW!

1. If the perimeter of the triangle below is 35, what is the value of x ?



2. What is the length of FG ?

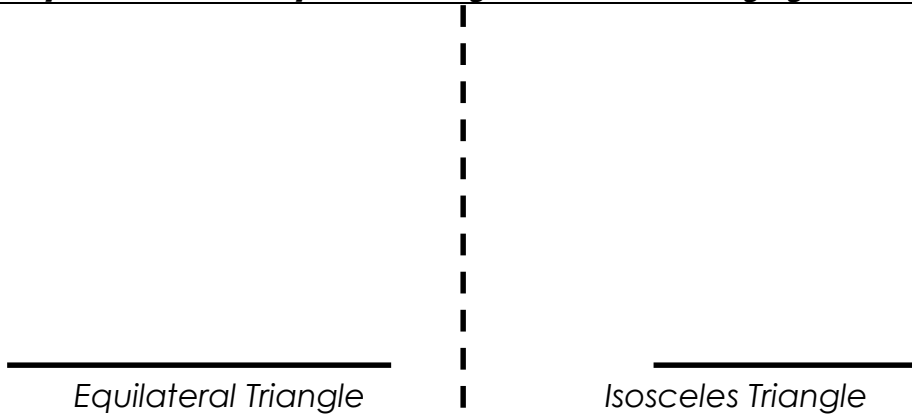


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6.1c – Construct Equilateral and Isosceles Triangles

Target 1: Demonstrate knowledge of triangle facts

Example 1: Construct an equilateral triangle and isosceles triangle given a base



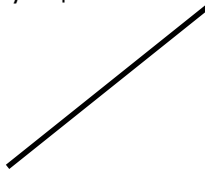
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YOU TRY NOW!

1. Construct an equilateral triangle given the following bases.

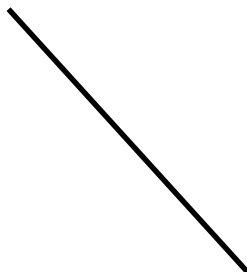
a) Equilateral

b) Equilateral



c) Isosceles

d) Isosceles



6.2a – Apply Congruence and Triangle

Target 2: Prove triangles congruent using Third Angles Theorem, SSS, HL, SAS, ASA, & AAS

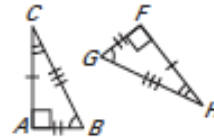
Vocabulary

Congruent Figures: _____

Corresponding Parts: _____

Example 1: Identify Congruent Parts

Write a congruence statement for the triangle. Identify all parts of congruent corresponding parts.



$\triangle ABC \cong \triangle$ _____

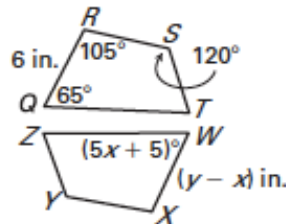
Corresponding Angles: $\angle A \cong$ _____, $\angle B \cong$ _____, $\angle C \cong$ _____

Example 2: Use

Corresponding Sides: $\overline{AB} \cong$ _____, $\overline{BC} \cong$ _____, $\overline{CA} \cong$ _____

Properties of Congruent Figures

In the diagram, $QRST \cong WXYZ$. Find x and y.



Third Angles Theorem



If two angles of one triangle are congruent to two other angles of another triangle, then the thirds angles are ALSO _____

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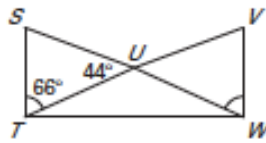
QR SCAN the images below for vocab!



Example 3: Use the Third Angles Theorem (ON YOUR OWN)

Find $m\angle V$.

Step 1: What can you conclude first?

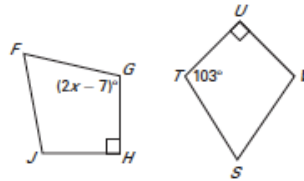


Step 2: What should all of the interior angles of a triangle add up to?

Step 3: Find $m\angle V$

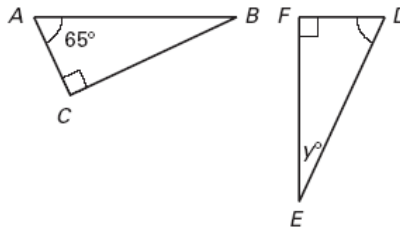
YOU TRY NOW!

1. $HGFJ \cong UTSV$. Identify all pairs of congruent corresponding parts. Write each pair in a congruent statement.

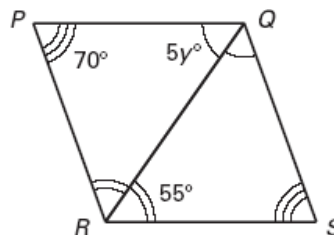


2. Find the value of x and find $m\angle G$.

3. Find y .



4. Find $m\angle S$.



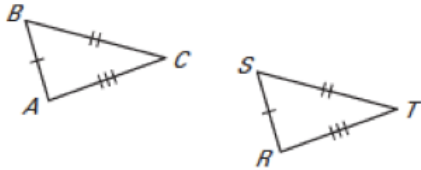
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6.2b – Prove Triangles Congruent by SSS and HL

Target 2: Prove triangles congruent using Third Angles Theorem, SSS, HL, SAS, ASA, & AAS

Side-Side-Side Congruence (SSS)

If three sides of one triangle are congruent to three sides of a second triangle, then the two sides are congruent.



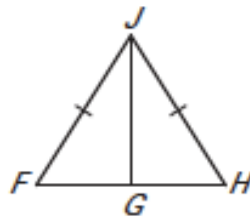
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Example 1: Use the SSS Congruence Postulate

Write a proof.

Given $\overline{FJ} \cong \overline{HJ}$,
 G is the midpoint of \overline{FH} .

Prove $\triangle FGJ \cong \triangle HGJ$

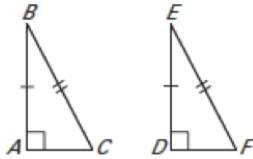


Statements

Reason

1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Hypotenuse-Leg Congruence (HL)

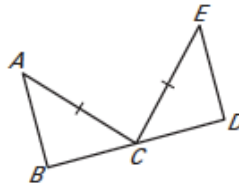


If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second triangle, then the two triangles are _____.

Example 2: Use the Hypotenuse-Leg Theorem

Given $\overline{AC} \cong \overline{EC}$,
 $\overline{AB} \perp \overline{BD}$,
 $\overline{ED} \perp \overline{BD}$,
 \overline{AC} is a bisector of \overline{BD} .

Prove $\triangle ABC \cong \triangle EDC$



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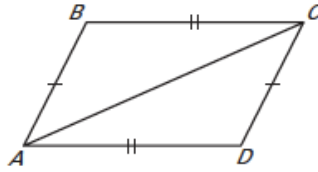
Statements	Reason
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

YOU TRY NOW!

1. Write a proof.

Given $\overline{FJ} \cong \overline{HJ}$,
 G is the midpoint of \overline{FH} .

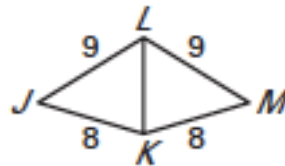
Prove $\triangle FGJ \cong \triangle HGJ$



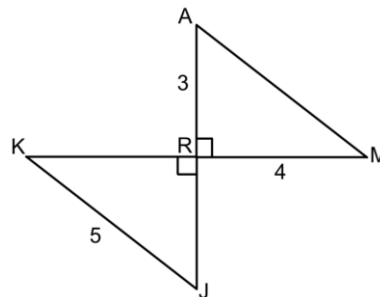
Statements	Reason
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

2. Decide whether the congruence statement is true.

$\triangle JKL \cong \triangle MKL$



3. Show that $\triangle KJR \cong \triangle MAR$ are congruent.

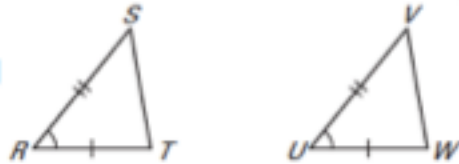


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6.2c – Prove Triangles Congruent by SAS, ASA, AAS

Target 2: Prove triangles congruent using Third Angles Theorem, SSS, HL, SAS, ASA, & AAS

Side-Angle-Side Congruence (SAS)

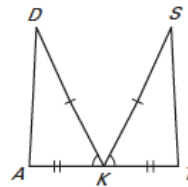


If two sides and the INCLUDED angle of one triangle are congruent to two sides and the INCLUDED angle of a second triangle, then the two triangles are congruent.

Example 1: Use the SAS Congruence Postulate

Is there enough information to prove that the triangle is congruent using SAS?

$\triangle DKA, \triangle TKS$



Example 2: Write a Proof Using SAS Congruence

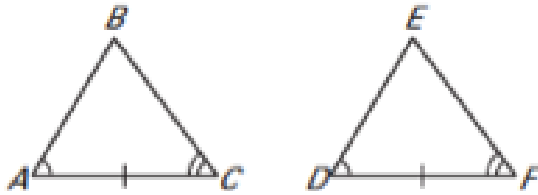
Write a proof. **GIVEN:** B is the midpoint of \overline{AE} .
 B is the midpoint of \overline{CD} .

PROVE: $\triangle ABD \cong \triangle EBC$

Statements	Reason
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

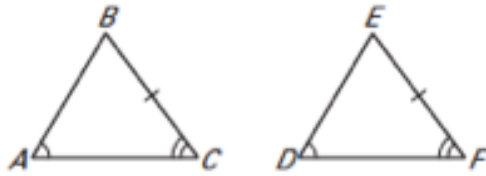
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Angle-Side-Angle Congruence (ASA)



If two angles and the INCLUDED side of one triangle are congruent to two angles and the INCLUDED side of a second triangle, then the two triangles are congruent.

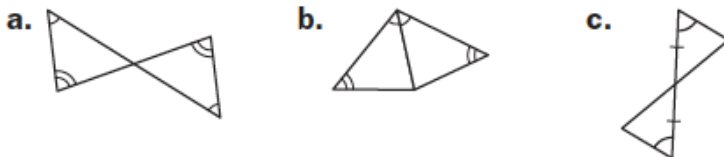
Angle-Angle Side Congruence (AAS)



If two angles and the non-INCLUDED side of one triangle are congruent to two angles and the corresponding non-INCLUDED side of a second triangle, then the two triangles are congruent.

Example 3: Identify congruent triangles

Can the triangles be proven congruent with the information given in the diagram? If so, state which postulate/theorem (SSS, SAS, ASA, AAS, HL) you would use?

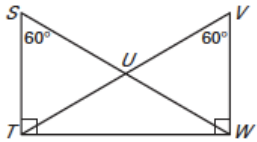


- a. Is there enough information? _____
Postulate/Theorem: _____
- b. Is there enough information? _____
Postulate/Theorem: _____
- c. Is there enough information? _____
Postulate/Theorem: _____

Annotate Here

YOU TRY NOW!

1. Can the triangles be proven congruent with the information given in the diagram? If so, state which postulate/theorem (SSS, SAS, ASA, AAS, HL) you would use?



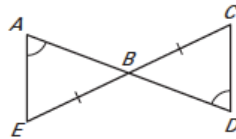
Is there enough information? _____

Postulate/Theorem: _____

2. Complete the proof.

GIVEN: $\overline{BE} \cong \overline{BC}$, $\angle A \cong \angle D$

PROVE: $\triangle ABE \cong \triangle DBC$

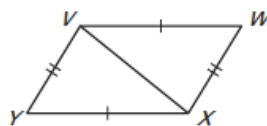


Statements	Reason
1.	1.
2.	2.
3.	3.
4.	4.

3. Complete the proof.

GIVEN: $\overline{VW} \cong \overline{XY}$, $\overline{WX} \cong \overline{YV}$

PROVE: $\triangle WXV \cong \triangle YVX$



Statements	Reason
1.	1.
2.	2.
3.	3.
4.	4.

Annotate Here