

Date	Topic/Assignment
<b>Tuesday</b> <b>January 5</b>	Angles of Triangles 1. 5-2 angles of Triangles WS (pages 1-2) 2. Chapter Practice Worksheet (page 3)
<b>Wednesday</b> <b>January 6</b>	Dilations 1. Notes (pages 4-6) 2. 6.1 Practice WS (pages 7-8)
<b>Thursday</b> <b>January 7</b>	Proving Triangles are Congruent 1. Notes (pages 9-13) 2. Congruent WS 1 (page 14) 3. Congruent WS 2 (page 15-16)
<b>Friday</b> <b>January 8</b>	More with proving triangles are congruent 1. 3 more worksheets (pages 17-19)
<b>Monday</b> <b>January 11</b>	<b>Quick QUIZ</b> Triangle Congruency Proofs 1. # 1-8 (pages 20-23) 2. find easy proof worksheet (page 24)
<b>Tuesday</b> <b>January 12</b>	Triangle Congruency Proofs 1. find easy worksheet of proofs (page 25)
<b>Wednesday</b> <b>January 13</b>	Proportions with Similarity 1. Similar Triangles Rectangles Ratios Notes (pages 26-27) 2. Proportions with similarity – basic practice (pages 28-29) 3. Proportions with similarity HW (pages 30-31)
<b>Thursday</b> <b>January 14</b>	Similar Triangles - Proving Triangles Similar Notes (pages 32-33) - Proving Triangles Similar WS (pages 34-37)
<b>Friday</b> <b>January 15</b>	Mid-segments and Proportions of Triangles - Mid-segment and Proportions Notes (pages 38-43) - Triangle Mid-segment Homework (pages 44-45) - Mid-segment of a Triangle HW II (pages 46-47)
<b>Monday</b> <b>January 18</b>	Review Stations Review for test!!!!
<b>Tuesday</b> <b>January 19</b>	<b>Half Test</b>

# 5-2

NAME \_\_\_\_\_

DATE \_\_\_\_\_

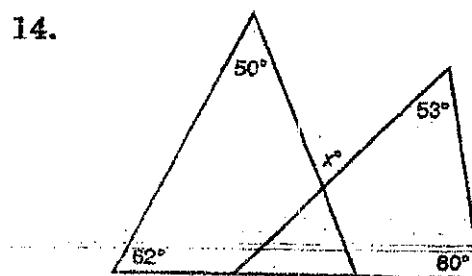
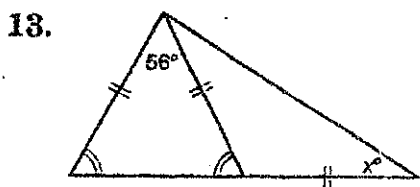
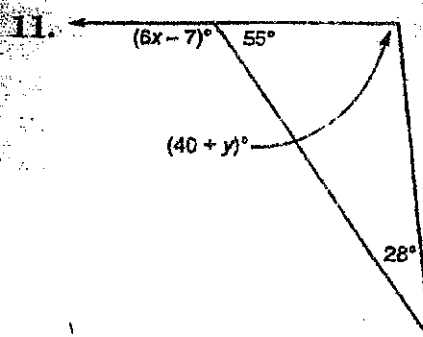
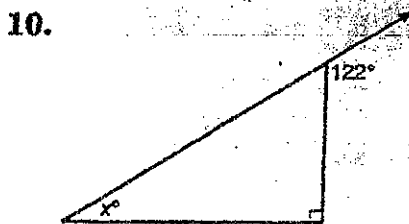
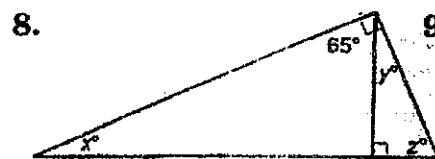
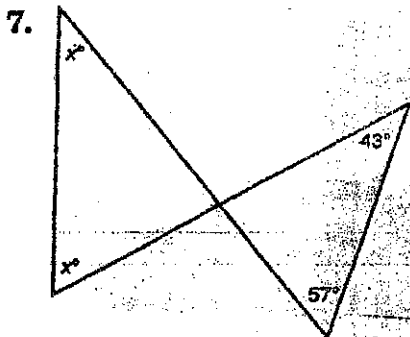
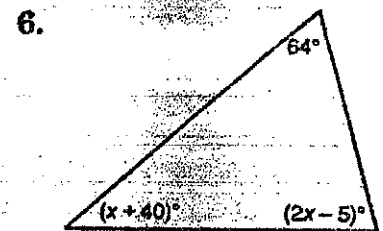
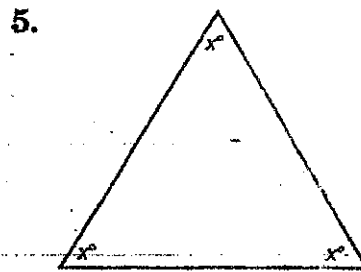
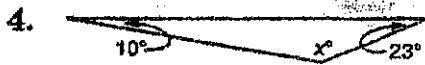
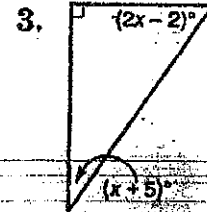
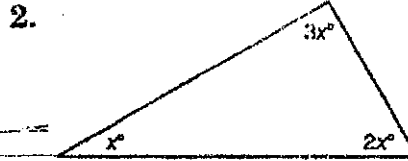
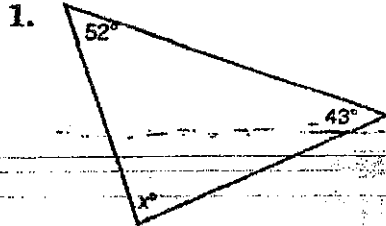
PERIOD \_\_\_\_\_

## Practice

Student Edition  
Pages 193-197

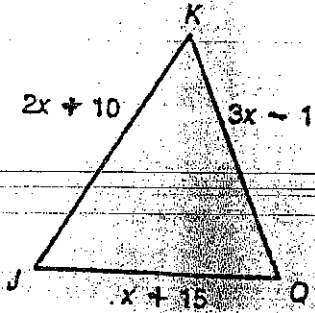
### Angles of a Triangle

Find the value of each variable.

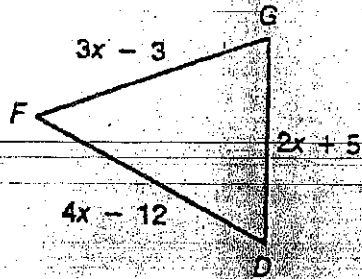


1

1.  $\triangle JKQ$  is isosceles with base  $\overline{JK}$ . Find  $x$ ,  $JK$ ,  $KQ$ ,  $JQ$ , and the perimeter of  $\triangle JKQ$ .

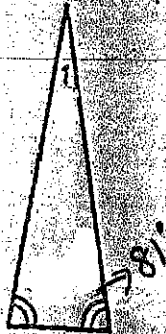


2. The perimeter of  $\triangle DFG$  is 89. Find  $x$ ,  $DF$ ,  $FG$ , and  $DG$ .

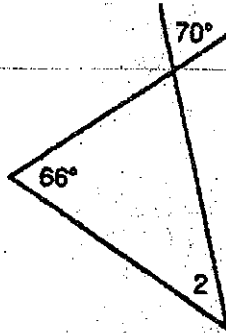


Find the measure of each numbered angle.

3.  $m\angle 1 =$

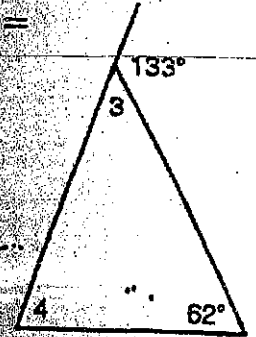


4.  $m\angle 2 =$



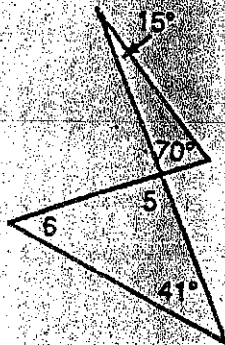
5.  $m\angle 3 =$

$m\angle 4 =$



6.  $m\angle 5 =$

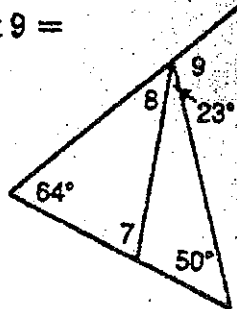
$m\angle 6 =$



7.  $m\angle 7 =$

$m\angle 8 =$

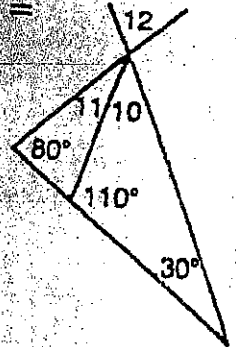
$m\angle 9 =$



8.  $m\angle 10 =$

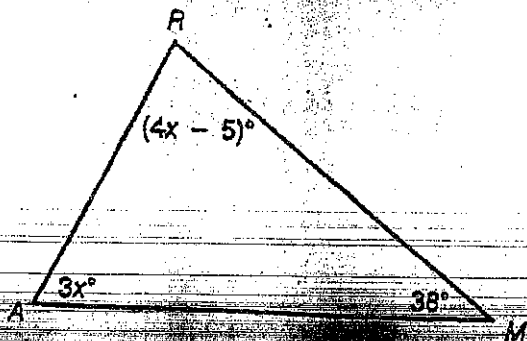
$m\angle 11 =$

$m\angle 12 =$

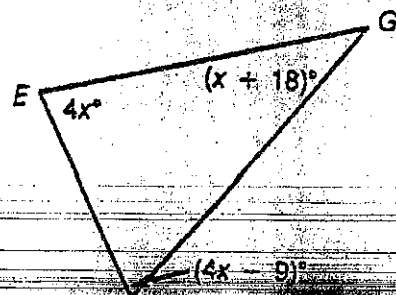


Find the measures indicated.

9. Find  $x$ ,  $m\angle A$ , and  $m\angle R$ .



10. Find  $x$ ,  $m\angle E$ , and  $m\angle G$ .

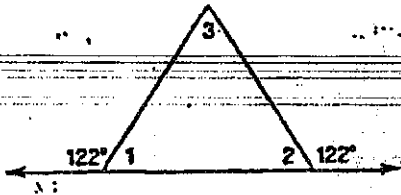


# Chapter Practice Worksheet

Name \_\_\_\_\_

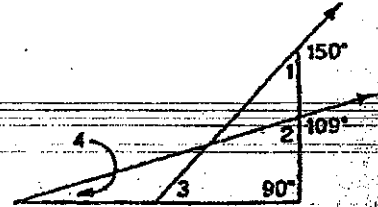
Find the measure of each numbered angle.

1.



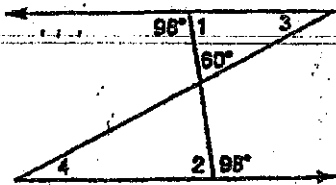
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}}, m\angle 3 = \underline{\hspace{2cm}}$

2.



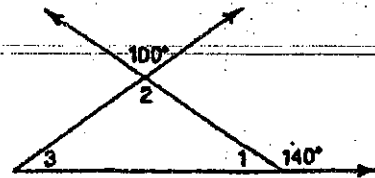
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}},$   
 $m\angle 3 = \underline{\hspace{2cm}}, m\angle 4 = \underline{\hspace{2cm}}$

3.



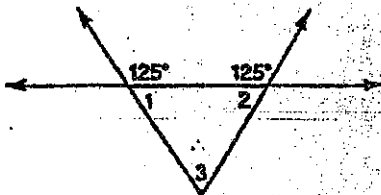
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}},$   
 $m\angle 3 = \underline{\hspace{2cm}}, m\angle 4 = \underline{\hspace{2cm}}$

4.



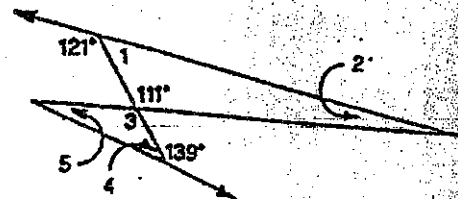
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}}, m\angle 3 = \underline{\hspace{2cm}}$

5.



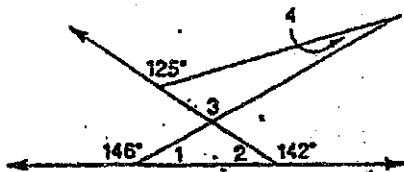
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}}, m\angle 3 = \underline{\hspace{2cm}}$

6.



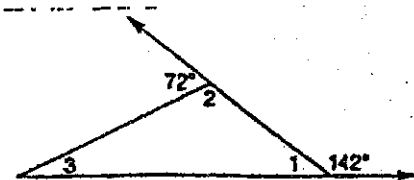
$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}},$   
 $m\angle 3 = \underline{\hspace{2cm}}, m\angle 4 = \underline{\hspace{2cm}}, m\angle 5 = \underline{\hspace{2cm}}$

7.



$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}},$   
 $m\angle 3 = \underline{\hspace{2cm}}, m\angle 4 = \underline{\hspace{2cm}}$

8.



$m\angle 1 = \underline{\hspace{2cm}}, m\angle 2 = \underline{\hspace{2cm}}, m\angle 3 = \underline{\hspace{2cm}}$

# DILATIONS

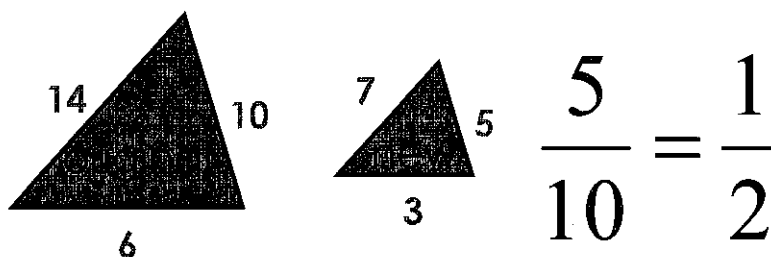
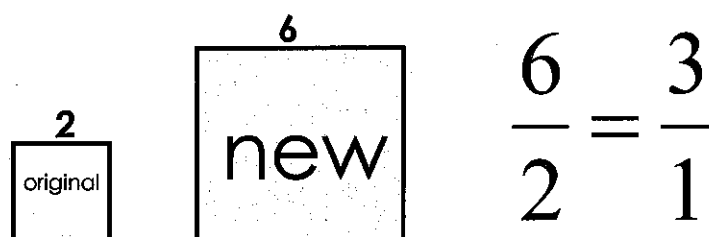
**Scale Factor – the ratio of a new image to its original image**

- **The ratio of corresponding sides**

# Scale Factor

- When scale factor is greater than 1, the shape gets *bigger* (enlargement).
- When scale factor is less than 1, but greater than 0, the shape gets *smaller* (reduction).

## SCALE FACTOR.



Find the coordinates of the dilation image for the given scale factor,  $k$ .

Example 1:

$G(0, -2)$ ,  $H(1, 3)$ , and  $I(4, 1)$ ;  $k = 2$

**All you do is multiply  $k$  to  $(x, y)$ .**

$G'(-4, -4)$ ,  $H'(2, 6)$ , and  $I'(8, 2)$

Find the coordinates of the dilation image for the given scale factor,  $k$ .

Example 2:

$L(8, -8)$ ,  $N(0, 16)$ , and  $M(4, 5)$ ;  $k = 1/4$

**All you do is multiply  $k$  to  $(x, y)$ .**

$L'(-2, -2)$ ,  $N'(0, 4)$ , and  $M'(1, 5/4)$

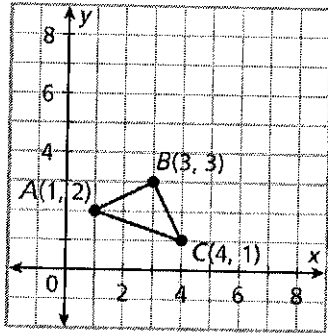
# CCGPS Geometry – 6.1 Practice

## Similarity and Transformations

Apply the dilation  $D$  to the polygon with the given vertices. Describe the dilation as an enlargement or a reduction.

1.  $D: (x, y) \rightarrow (2x, 2y)$

$A(1, 2), B(3, 3), C(4, 1)$



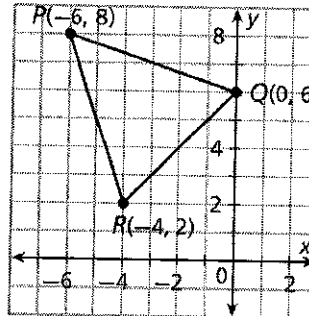
$A'$  \_\_\_\_\_

$B'$  \_\_\_\_\_

$C'$  \_\_\_\_\_

2.  $D: (x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$

$P(-6, 8), Q(0, 6), R(-4, 2)$



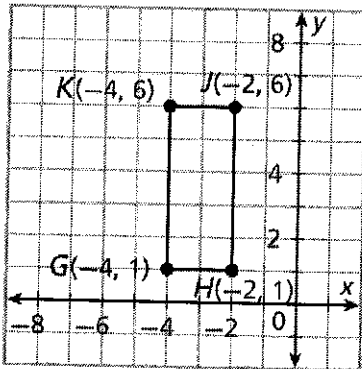
$P'$  \_\_\_\_\_

$Q'$  \_\_\_\_\_

$R'$  \_\_\_\_\_

3.  $D: (x, y) \rightarrow (1.5x, 1.5y)$

$G(-4, 1), H(-2, 1), J(-2, 6), K(-4, 6)$



$G'$  \_\_\_\_\_

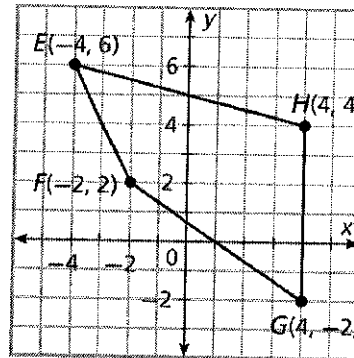
$H'$  \_\_\_\_\_

$J'$  \_\_\_\_\_

$K'$  \_\_\_\_\_

4.  $D: (x, y) \rightarrow (0.75x, 0.75y)$

$E(-4, 6), F(-2, 2), G(4, -2), H(4, 4)$



$E'$  \_\_\_\_\_

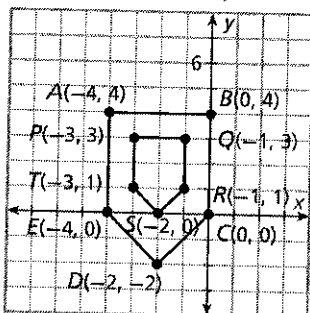
$F'$  \_\_\_\_\_

$G'$  \_\_\_\_\_

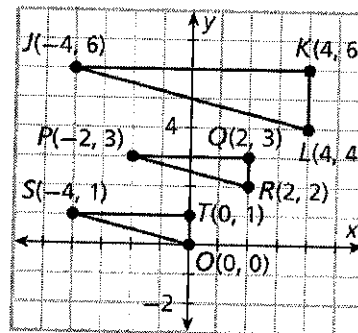
$H'$  \_\_\_\_\_

Determine whether the polygons with the given vertices are similar. *Hint: check the lengths of their sides.*

5.  $A(-4, 4), B(0, 4), C(0, 0), D(-2, -2), E(-4, 0); P(-3, 3), Q(-1, 3), R(-1, 1), S(-2, 0), T(-3, 1)$



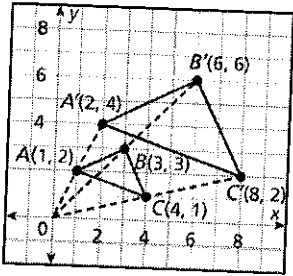
6.  $J(-4, 6), K(4, 6), L(4, 4); P(-2, 3), Q(2, 3), R(2, 2); S(-4, 1), T(0, 1), O(0, 0)$



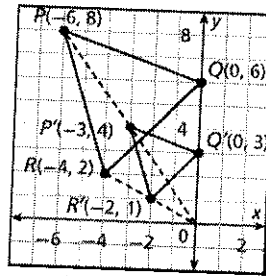


**Standard MCC9-12.G.SRT.1:**

A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

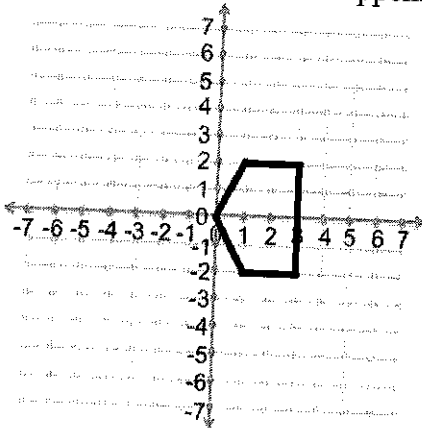


(from #1 above)



(from #2 above)

What if the center of the dilation passes through one of the sides of the triangle? Draw a dilation with a factor of 2 to see what happens.



**SIMILARITY OF DIFFERENT SHAPES:**

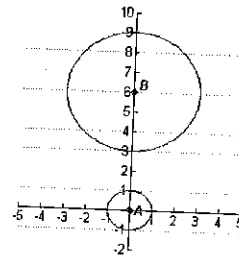
Squares? YES or NO

Rectangles? YES or NO

Equilateral Triangle? YES or NO

Isosceles Triangle? YES or NO

Circles? YES or NO



• • |

## Proving Triangles are Congruent!!

• • | Ex. 1

$\triangle CAT \cong \triangle DOG$   
by SSS

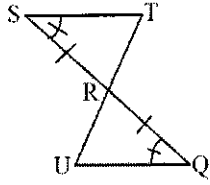
• • | Ex 2

$\triangle RED \cong \triangle CAP$   
by SAS

• • | Ex 3

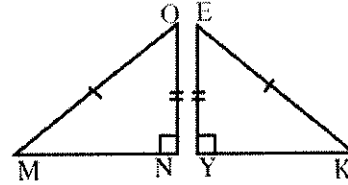
$\triangle BOX \cong \triangle CAR$   
by ASA

• • | Ex 4



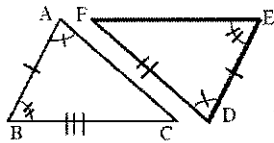
$\Delta STR \cong \Delta QUR$   
by ASA

• • | Ex 5



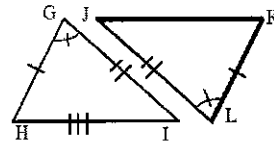
$\Delta MON \cong \Delta KEY$   
by HL

• • | Ex 6



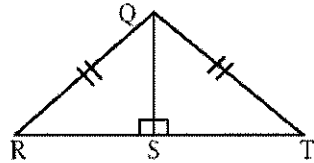
$\Delta ABC \cong \Delta DEF$   
by ASA

• • | Ex 7



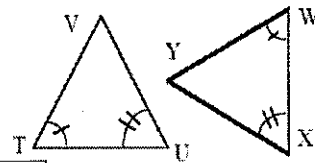
$\Delta GHI \cong \Delta LKJ$   
by SAS

• • | Ex 8



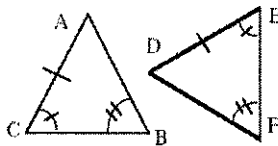
$\triangle RSQ \cong \triangle TSQ$   
by HL

• • | Ex 9



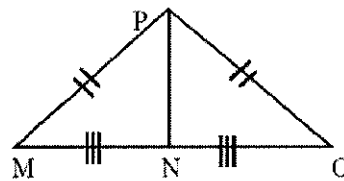
No not enough info

• • | Ex 10



$\triangle ABC \cong \triangle DFE$   
by AAS

• • | Ex 11



$\triangle MNP \cong \triangle ONP$   
by SSS

• • | Ex 12

$\triangle POQ \cong \triangle ROS$   
by SAS

• • | Ex 13

$\triangle XWZ \cong \triangle XYZ$   
by AAS

• • | Ex 14

$\triangle GHI \cong \triangle IJG$   
by SSS

• • | Ex 15

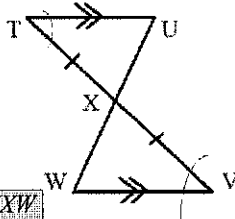
Hint: Use Pythagorean Thm

$\triangle GHE \cong \triangle HGI$   
by SSS or HL

• #

Ex 16

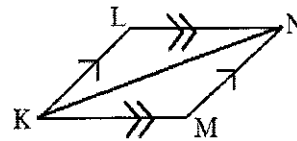
Hint: TU is parallel to WV and TV is the transversal



$\Delta TXU \cong \Delta VXW$   
by ASA

• #

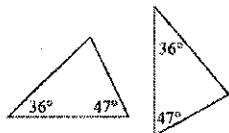
Ex 17



$\Delta LKM \cong \Delta MNK$   
by ASA

• #

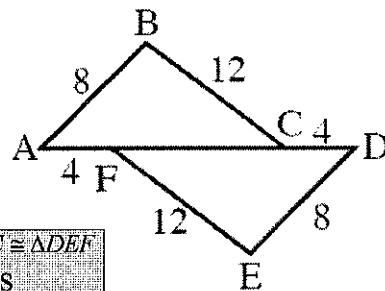
Ex 18



Not congruent  
AAA does not work

• #

Ex 19



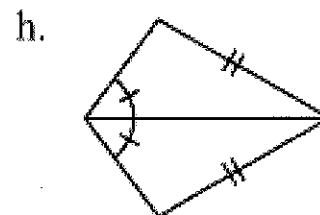
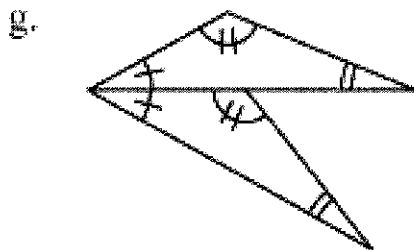
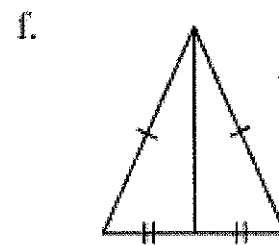
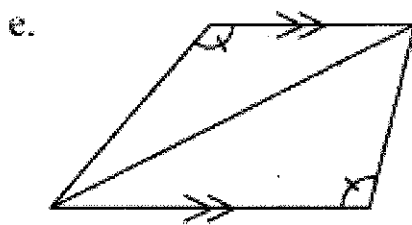
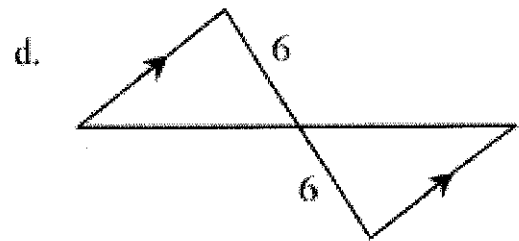
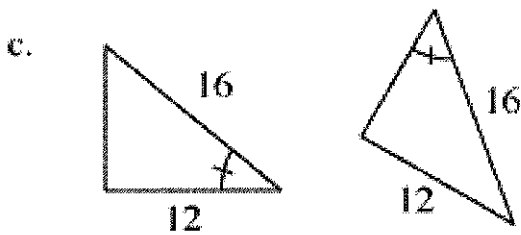
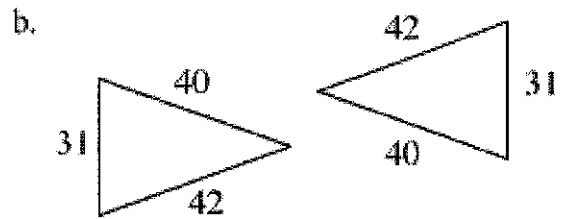
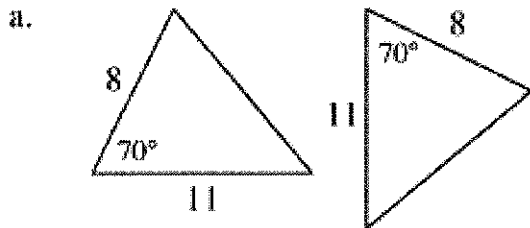
$\Delta ABC \cong \Delta DEF$   
by SSS

# Congruent Triangles WS 1

Name: \_\_\_\_\_

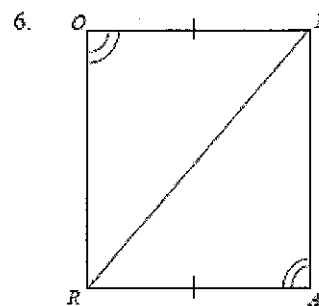
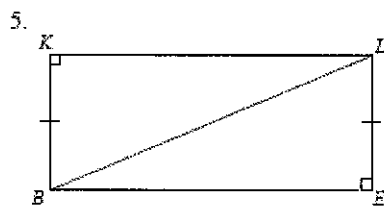
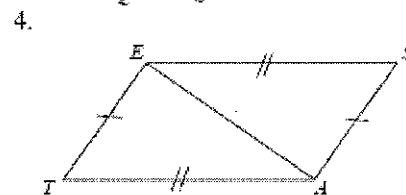
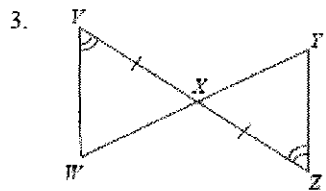
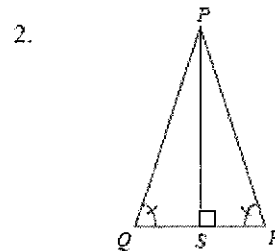
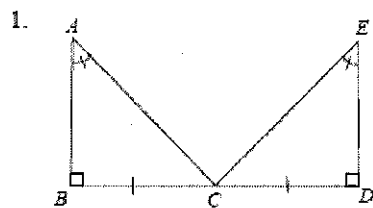
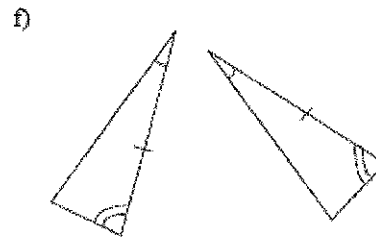
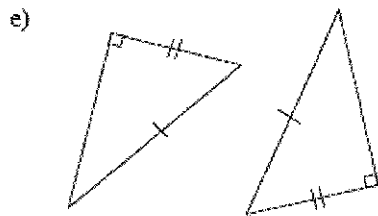
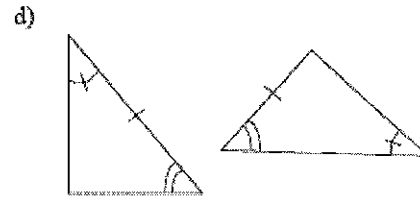
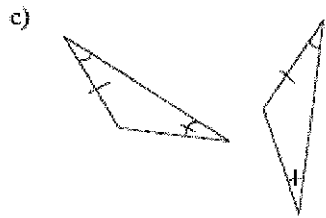
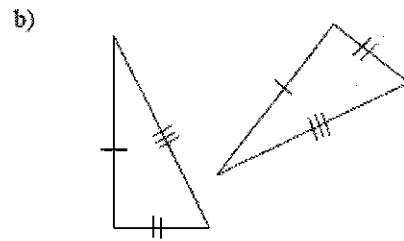
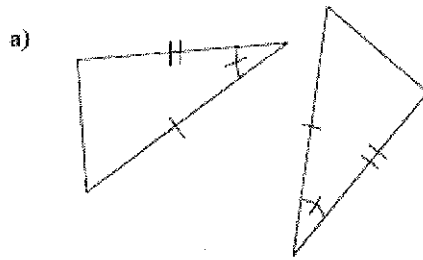
Use your triangle congruence conjectures to determine if the following pairs of triangles must be congruent.

Note: The Diagrams are not necessarily drawn to scale.



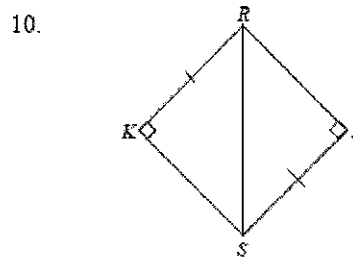
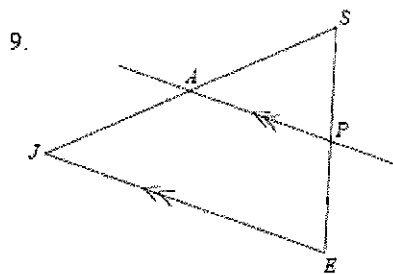
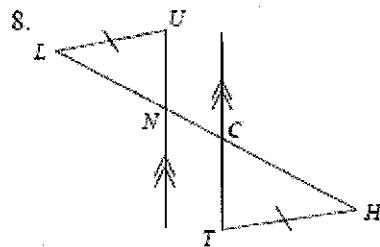
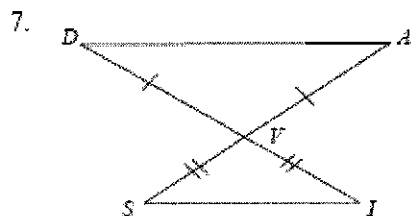
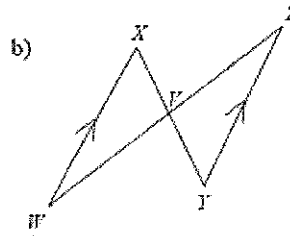
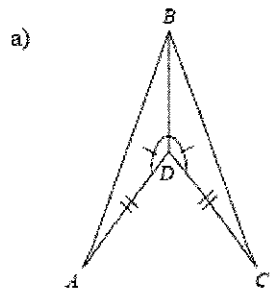
List your Five Triangle Congruence Shortcuts:

Using your congruence shortcuts, decide if the triangles are congruent. Write the shortcut you used.





7. Decide if the triangles below are congruent, similar or neither. Write the shortcut that you used.

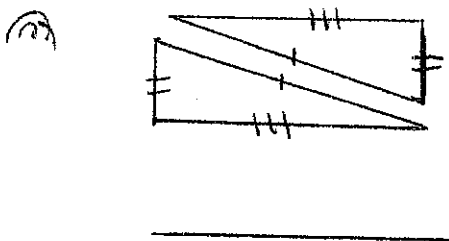
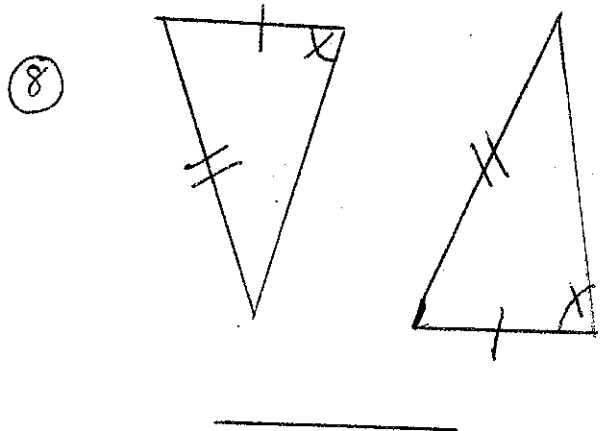
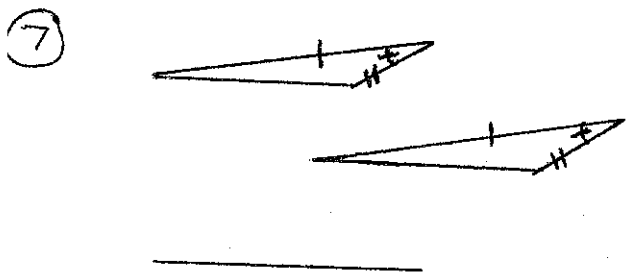
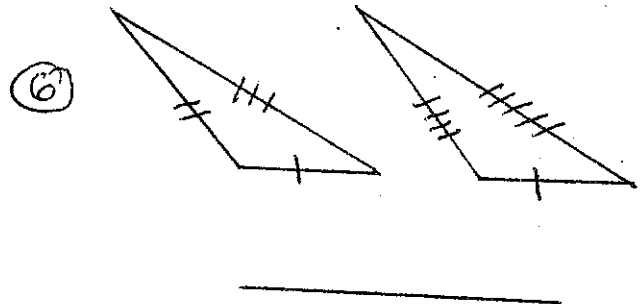
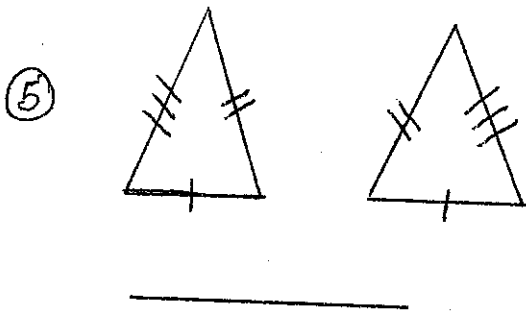
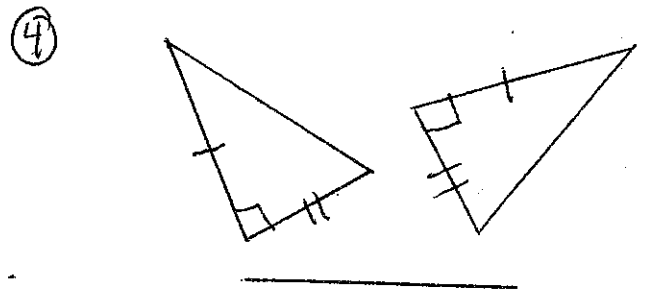
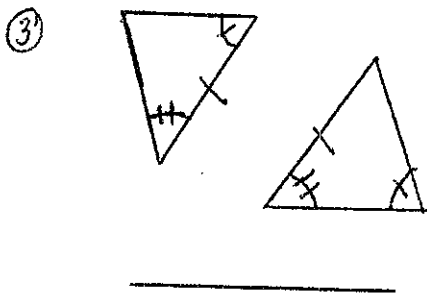
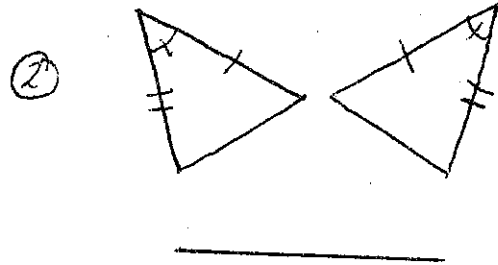
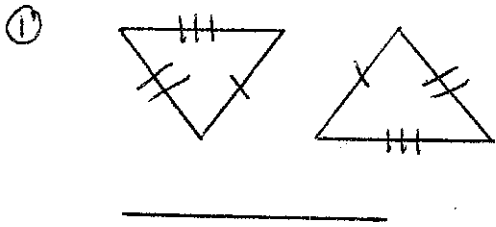


# INFORMAL GEOMETRY

## SSS AND SAS

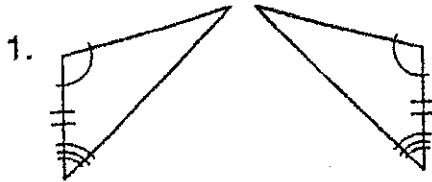
NAME \_\_\_\_\_

Answer as SSS, SAS, or NO.

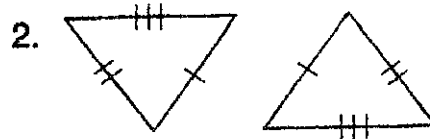


# Name the Congruence Rule!

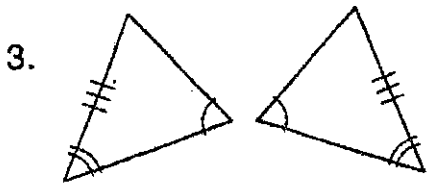
Are the triangles in each pair congruent? If so, write **SSS**, **SAS**, **ASA**, **AAS**, or **HL** to show how you proved congruence. If you cannot prove congruence, write **NOT**.



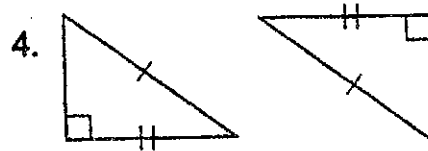
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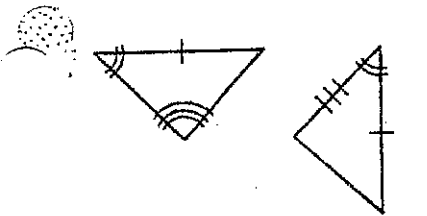
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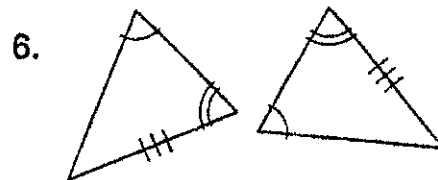
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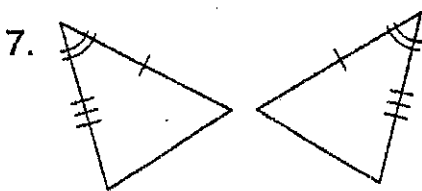
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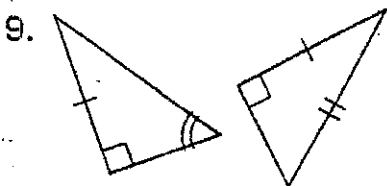
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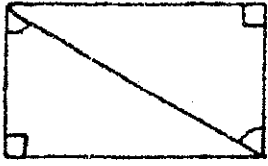


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$\cong$   $\Delta$ s Worksheet 2

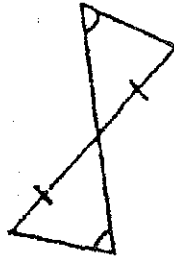
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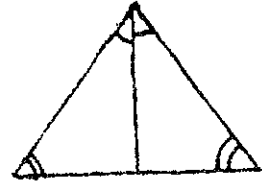
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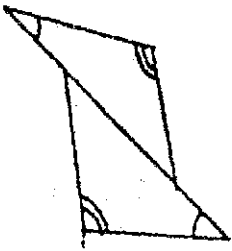
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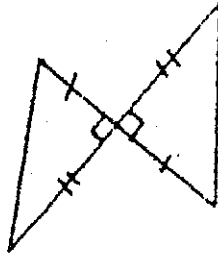
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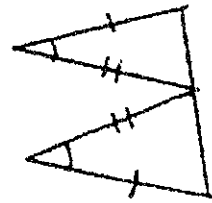
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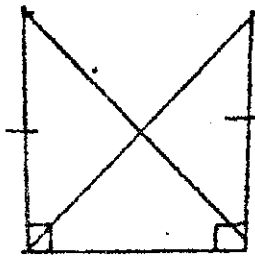
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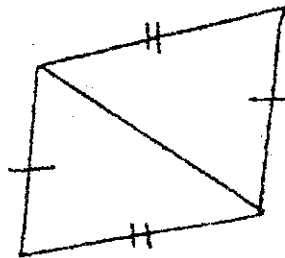
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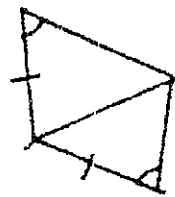
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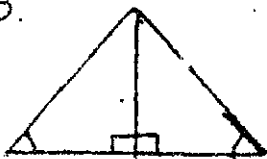
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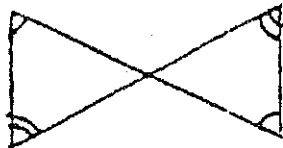
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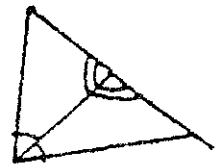
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11.



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12.



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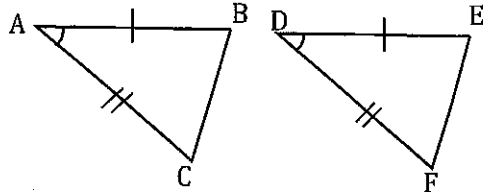
# Proofs Involving Congruent Triangles

First, let's analyze some proofs.

This is easy! All you have to do is explain in plain English what is going on in the proofs. We'll look at some examples first.

AE. 1.

Given:  $\overline{AB} \cong \overline{DE}$ ,  $\overline{AC} \cong \overline{DF}$ , and  $\angle A \cong \angle D$



Prove:  $\triangle ABC \cong \triangle DEF$

Statements	Reasons
1. $\overline{AB} \cong \overline{DE}$	1. Given
2. $\overline{AC} \cong \overline{DF}$	2. Given
3. $\angle A \cong \angle D$	3. Given
4. $\triangle ABC \cong \triangle DEF$	4. SAS

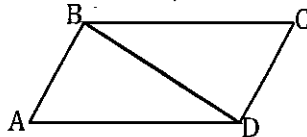
Analysis:

Working backward we must ask the key question, "How can we show that two triangles are congruent?"

The answer? A triangle congruence theorem like SSS, SAS, ASA, AAS or HL. This gives us B1:  $\triangle ABC \cong \triangle DEF$ , by some property, but which one? To find out, start working forward. Listing all of the given information gives us a pair of angles  $\angle A$  and  $\angle D$  sandwiched between a pair of congruent sides  $\overline{AB} \cong \overline{DE}$  and  $\overline{AC} \cong \overline{DF}$ . So this means we have  $\triangle ABC \cong \triangle DEF$  by the SAS theorem which is B2: and the proof is complete.

AE. 2.

Given:  $\overline{AB} \cong \overline{CD}$ ,  $\overline{AD} \cong \overline{CB}$



Prove:  $\triangle ABD \cong \triangle CBD$

Statements	Reasons
1. $\overline{AB} \cong \overline{CD}$	1. Given
2. $\overline{AD} \cong \overline{CB}$	2. Given
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive property
4. $\triangle ABD \cong \triangle CBD$	4. SSS

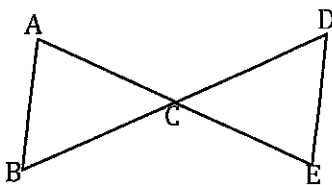
Analysis:

Working backward, we must ask the key question "How can we show that two triangles are congruent?"

The answer? A triangle congruence theorem like SSS, SAS, ASA, AAS or HL. This gives us B1:  $\triangle ABC \cong \triangle BCD$  by some property, but which one? Then start working forward. Listing all of the given information gives us two pairs of sides  $\overline{AB} \cong \overline{CD}$  and  $\overline{AD} \cong \overline{CB}$ , but this is not enough. We need another pair of sides or an angle between them. Looking now at the diagram we have  $\overline{BD} \cong \overline{BD}$  as a shared line. So this brings us to say  $\triangle ABC \cong \triangle BCD$  by SSS which is B1 and the proof is complete.

AE. 3.

Given:  $\overline{AE}$  Bisects  $\overline{BD}$ ,  $\angle B \cong \angle D$



Prove:  $\triangle ABC \cong \triangle DBC$

Statements	Reasons
1. $\angle B \cong \angle D$	1. Given
2. $\overline{AC}$ Bisects $\overline{BD}$	2. Given
3. $\overline{BC} \cong \overline{DC}$	3. Definition of Bisect
4. $\angle ACB \cong \angle DCE$	4. Vertical angles
5. $\triangle ABC \cong \triangle DBC$	5. ASA

Analysis:

Working backward we must ask the key question, "How can we show that two triangles are congruent?"

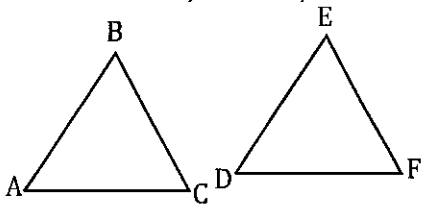
The answer? A triangle congruence theorem like SSS, SAS, ASA, AAS or HL. This gives us B1:  $\triangle ABC \cong \triangle DBC$  by some property, but which one? Then start working forward. Listing all of the given information gives us a pair of angles  $\angle B$  and  $\angle D$ , and  $\overline{BD}$  and  $\overline{AE}$  bisects  $\overline{BD}$ . If  $\overline{AE}$  bisects  $\overline{BD}$  then  $\overline{BD}$  is cut in half at C so  $\overline{BC} \cong \overline{DC}$ ! This is not enough though. Looking at the diagram we see vertical angles  $\angle ACB \cong \angle DCE$ , which gives us  $\triangle ABC \cong \triangle DBC$  by the property ASA. This is B1 and the proof is complete.

Your turn! Write an analysis of each proof involving congruent triangles.

1.

Analysis:

Given:  $\overline{BC} \cong \overline{EF}$ ,  $\angle B \cong \angle E$ , and  $\angle C \cong \angle F$



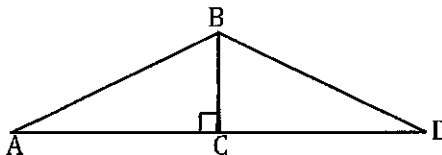
Prove:  $\triangle ABC \cong \triangle DEF$

Statements	Reasons
1. $\overline{BC} \cong \overline{EF}$	1. Given
2. $\angle B \cong \angle E$	2. Given
3. $\angle C \cong \angle F$	3. Given
4. $\triangle ABC \cong \triangle DEF$	4. ASA

2.

Analysis:

Given:  $\overline{AB} \cong \overline{BD}$



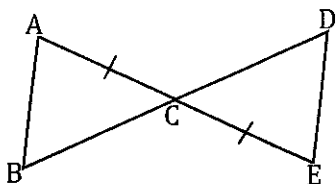
Prove:  $\triangle ABC \cong \triangle BDC$

Statements	Reasons
1. $\overline{AB} \cong \overline{BD}$	1. Given
2. $\overline{BC} \cong \overline{BC}$	2. Reflexive property
3. $\triangle ABC \cong \triangle BDC$	3. HL

3.

Analysis:

Given  $\overline{AB} \parallel \overline{ED}$ ,  $\overline{AC} \cong \overline{EC}$



Prove:  $\triangle ABC \cong \triangle EDC$

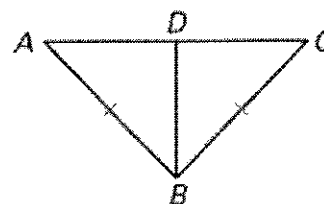
Statements	Reasons
1. $\overline{AB} \parallel \overline{ED}$	1. Given
2. $\overline{AC} \cong \overline{EC}$	2. Given
3. $\angle A \cong \angle E$	3. Alternate Interior angles
4. $\angle ACB \cong \angle DCE$	4. Vertical angles
5. $\triangle ABC \cong \triangle EDC$	5. ASA

**Proof #1**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{AB} \cong \overline{CB}$ ,  $D$  is the midpoint of  $\overline{AC}$ .

**PROVE:**  $\triangle ABD \cong \triangle CBD$



Statements	Reasons
1. $\overline{AB} \cong \overline{CB}$	1. ?
2. $D$ is the midpoint of $\overline{AC}$ .	2. ?
3. $\overline{AD} \cong \overline{CD}$	3. ?
4. $\overline{BD} \cong \overline{BD}$	4. ?
5. $\triangle ABD \cong \triangle CBD$	5. ?

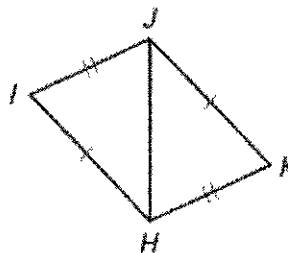
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**Proof #2**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{HI} \cong \overline{JK}$ ,  
 $\overline{IJ} \cong \overline{KH}$

**PROVE:**  $\triangle HIJ \cong \triangle JKH$



Statements	Reasons
1. ?	1. Given
2. ?	2. Given
3. ?	3. Reflexive Property of Congruence
4. ?	4. SSS Congruence Postulate

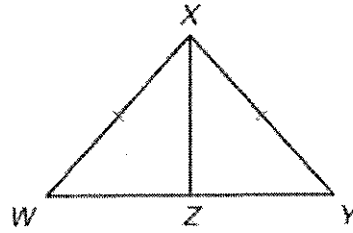
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**Proof #3**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{WX} \cong \overline{YX}$ ,  
 $Z$  is the midpoint of  $\overline{WY}$ .

**PROVE:**  $\triangle WXZ \cong \triangle YXZ$



Statements	Reasons
1. <u>  ?</u>	1. Given
2. <u>  ?</u>	2. Given
3. <u>  ?</u>	3. Definition of Midpoint
4. <u>  ?</u>	4. Reflexive Property of Congruence
5. <u>  ?</u>	5. SSS Congruence Postulate

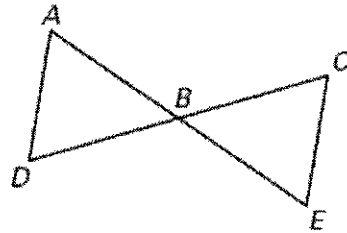
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**Proof #4**

Proof Copy and complete the proof.

**GIVEN:**  $B$  is the midpoint of  $\overline{AE}$ .  
 $B$  is the midpoint of  $\overline{CD}$ .

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



Statements	Reasons
1. $B$ is the midpoint of $\overline{AE}$ .	1. <u>  ?</u>
2. <u>  ?</u>	2. Definition of midpoint
3. $B$ is the midpoint of $\overline{CD}$ .	3. <u>  ?</u>
4. <u>  ?</u>	4. Definition of midpoint
5. $\angle ABD \cong \angle EBC$	5. <u>  ?</u>
6. $\triangle ABD \cong \triangle EBC$	6. <u>  ?</u>

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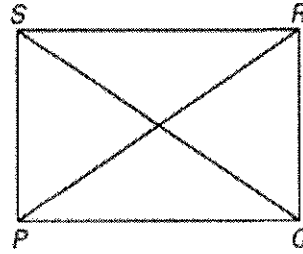


**Proof #5**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{QS} \cong \overline{PR}$ ,  $\overline{PS} \perp \overline{RS}$ ,  $\overline{QR} \perp \overline{RS}$

**PROVE:**  $\triangle PRS \cong \triangle QSR$



Statements	Reasons
1. $\overline{QS} \cong \overline{PR}$	1. Given
2. $\overline{PS} \perp \overline{RS}$ , $\overline{QR} \perp \overline{RS}$	2. Given
3. $\angle S$ and $\angle R$ are right angles.	3. ?
4. ?	4. Definition of a right triangle
5. $\overline{RS} \cong \overline{SR}$	5. ?
6. $\triangle PRS \cong \triangle QSR$	6. ?

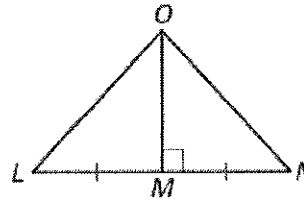
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**Proof #6**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{OM} \perp \overline{LN}$ ,  $\overline{ML} \cong \overline{MN}$

**PROVE:**  $\triangle OML \cong \triangle OMN$



Statements	Reasons
1. $\overline{OM} \perp \overline{LN}$	1. Given
2. ?	2. If 2 angles are $\perp$ , then they form 4 right $\angle$ s.
3. ?	3. Right Angle Congruence Theorem
4. $\overline{ML} \cong \overline{MN}$	4. ?
5. $\overline{OM} \cong \overline{OM}$	5. ?
6. $\triangle OML \cong \triangle OMN$	6. ?

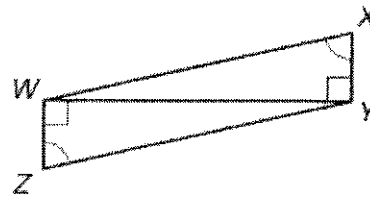
Jan 25-3:32 PM

**Proof #7**

Proof Copy and complete the proof.

**GIVEN:**  $\angle XYW \cong \angle ZWY$ ,  
 $\angle WXY \cong \angle YZW$

**PROVE:**  $\triangle XYW \cong \triangle ZWY$



Statements	Reasons
1. $\angle XYW \cong \angle ZWY$	1. <u>?</u>
2. $\angle WXY \cong \angle YZW$	2. <u>?</u>
3. $\overline{WY} \cong \overline{WY}$	3. <u>?</u>
4. $\triangle XYW \cong \triangle ZWY$	4. <u>?</u>

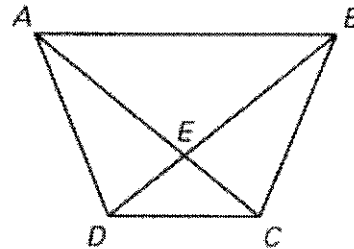
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**Proof #8**

Proof Copy and complete the proof.

**GIVEN:**  $\overline{DE} \cong \overline{CE}$ ,  $\angle ADE \cong \angle BCE$

**PROVE:**  $\triangle AED \cong \triangle BEC$



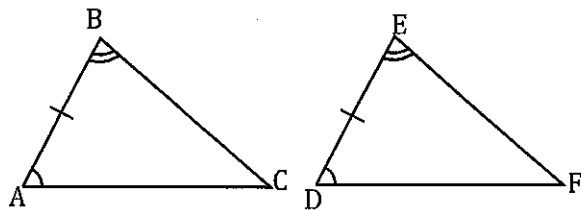
Statements	Reasons
1. $\overline{DE} \cong \overline{CE}$	1. <u>?</u>
2. $\angle ADE \cong \angle BCE$	2. <u>?</u>
3. $\angle AED \cong \angle BEC$	3. <u>?</u>
4. $\triangle AED \cong \triangle BEC$	4. <u>?</u>

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For these fill in any missing statements or reasons.

1.

Given:  $\overline{AB} \cong \overline{DE}$ ,  $\angle B \cong \angle E$ , and  $\angle A \cong \angle D$

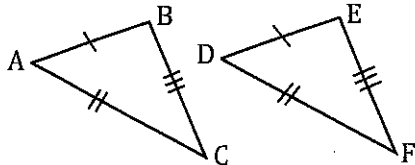


Prove:  $\triangle ABC \cong \triangle DEF$

Statements	Reasons
1. $\overline{AB} \cong \overline{DE}$	1. Given
2.	2. Given
3. $\angle A \cong \angle D$	3.
4. $\triangle ABC \cong \triangle DEF$	4.

3.

Given:  $\overline{AB} \cong \overline{DE}$ ,  $\overline{AC} \cong \overline{DF}$ , and  $\overline{BC} \cong \overline{EF}$

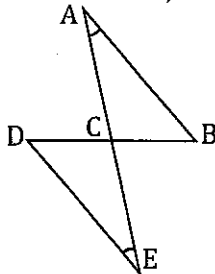


Prove:  $\triangle ABC \cong \triangle DEF$

Statements	Reasons
1. $\overline{AB} \cong \overline{DE}$	1.
2.	2.
3.	3.
4.	4. SSS

5.

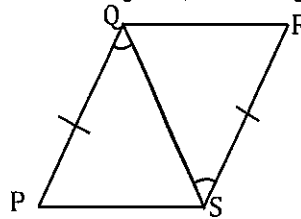
Given:  $\overline{AE}$  bisects  $\overline{BD}$ ,  $\angle A \cong \angle E$



Prove:  $\triangle ABC \cong \triangle EDC$

Statements	Reasons
1. $\angle A \cong \angle E$	1.
2.	2. Given
3.	3. Definition of Bisect
4. $\angle ACB \cong \angle DCE$	4.
5. $\triangle ABC \cong \triangle EDC$	5.

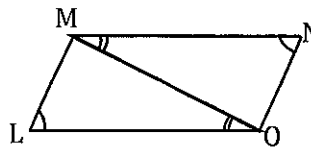
2. Given:  $\overline{PQ} \cong \overline{RS}$ , and  $\angle PQS \cong \angle RSQ$



Prove:  $\triangle PQS \cong \triangle RSQ$

Statements	Reasons
1.	1. Given
2.	2. Given
3. $\overline{QS} \cong \overline{QS}$	3.
4. $\triangle PQS \cong \triangle RSQ$	4.

4. Given:  $\angle L \cong \angle N$ ,  $\angle LOM \cong \angle NMO$

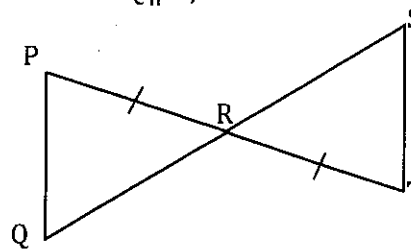


Prove:  $\triangle LMO \cong \triangle NMO$

Statements	Reasons
1.	1.
2.	2. Given
3.	3. Reflexive Property
4. $\triangle LMO \cong \triangle NMO$	4.

6.

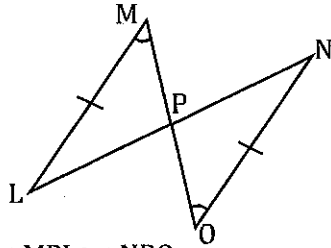
Given:  $\overline{PQ} \parallel \overline{ST}$ ,  $\overline{PR} \cong \overline{TR}$



Prove:  $\triangle PQR \cong \triangle TSR$

Statements	Reasons
1. $\overline{PR} \cong \overline{TR}$	1.
2.	2. Given
3. $\angle P \cong \angle T$	3.
4. $\angle ACB \cong \angle DCE$	4.
5.	5. ASA

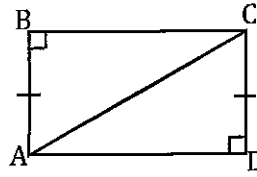
7. Given:  $\overline{LM} \cong \overline{NO}$ , and  $\angle M \cong \angle O$



Prove:  $\triangle MPL \cong \triangle NPO$

Statements	Reasons
1. $\overline{LM} \cong \overline{NO}$	1.
2.	2. Given
3.	3.
4.	4. AAS

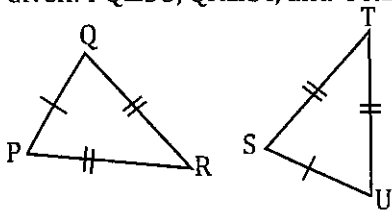
8. Given:  $\overline{AB} \cong \overline{DC}$



Prove:  $\triangle ABC \cong \triangle CDA$

Statements	Reasons
1.	1. Given
2. $\overline{AC} \cong \overline{AC}$	2.
3. $\triangle ABC \cong \triangle CDA$	3.

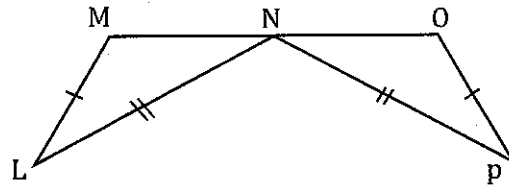
9. Given:  $\overline{PQ} \cong \overline{SU}$ ,  $\overline{QR} \cong \overline{ST}$ , and  $\overline{PR} \cong \overline{TU}$



Prove:  $\triangle PQR \cong \triangle STU$

Statements	Reasons
1.	1. Given
2.	2. Given
3.	3.
4. $\triangle PQR \cong \triangle STU$	4.

10. Given: N is the midpoint of  $\overline{MO}$ ,  $\overline{LM} \cong \overline{OP}$ , and  $\overline{LN} \cong \overline{PN}$

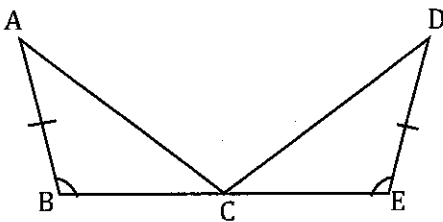


Prove:  $\triangle LMN \cong \triangle PON$

Statements	Reasons
1. $\overline{LM} \cong \overline{OP}$	1. Given
2. $\overline{LN} \cong \overline{PN}$	2.
3. N is the Midpoint of $\overline{MO}$	3. Given
4.	4. Midpoint
5.	5. SSS

- 11.

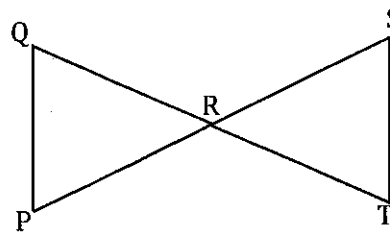
Given: C is the midpoint of  $\overline{BE}$ ,  $\angle B \cong \angle E$ , and  $\overline{AB} \cong \overline{DE}$



Prove:  $\triangle ABC \cong \triangle DEC$

Statements	Reasons
1. $\angle B \cong \angle E$	1.
2. $\overline{AB} \cong \overline{DE}$	2.
3.	3. Given
4.	4. Midpoint
5. $\triangle ABC \cong \triangle DEC$	5. SAS

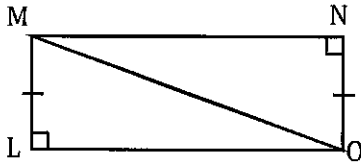
12. Given:  $\overline{QT}$  bisects  $\overline{SP}$ ,  $\overline{SP}$  bisects  $\overline{QT}$



Prove:  $\triangle QRP \cong \triangle SRT$

Statements	Reasons
1. $\overline{QT}$ bisects $\overline{SP}$	1. Given
2.	2. Given
3. $\overline{QR} \cong \overline{TR}$	3. Definition of Bisect
4. $\overline{PR} \cong \overline{SR}$	4.
5.	5. Vertical Angles
6. $\triangle QRP \cong \triangle SRT$	6.

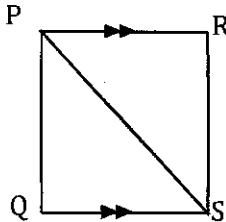
13. Given:  $\overline{LM} \cong \overline{NO}$



Prove:  $\triangle LMO \cong \triangle NOM$

Statements	Reasons
1. $\overline{LM} \cong \overline{NO}$	1.
2.	2.
3.	3.

15. Given:  $\overline{PR} \parallel \overline{QS}$ ,  $\angle QPS \cong \angle RSP$

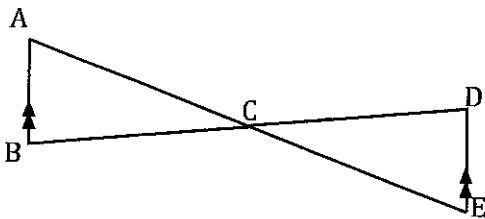


Prove:  $\triangle PQS \cong \triangle SRP$

Statements	Reasons
1. $\overline{PR} \parallel \overline{QS}$	1.
2. $\angle QPS \cong \angle RSP$	2.
3. $\angle PSQ \cong \angle SPR$	3. Alternate Interior
4.	4. Reflexive Property
5. $\triangle PQS \cong \triangle SRP$	5.

17.

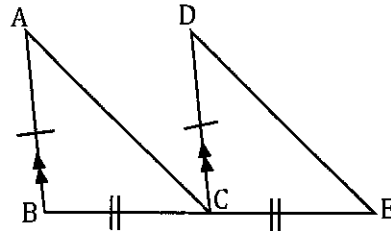
Given:  $\overline{AE}$  bisects  $\overline{BD}$ ,  $\overline{AB} \parallel \overline{DE}$



Prove:  $\triangle ABC \cong \triangle DCE$

Statements	Reasons
1. $\overline{AE}$ bisects $\overline{BD}$	1.
2.	2. Given
3. $\overline{BC} \cong \overline{DC}$	3.
4. $\angle ACB \cong \angle DCB$	4.
5.	5. Alternate Interior
6.	6. ASA

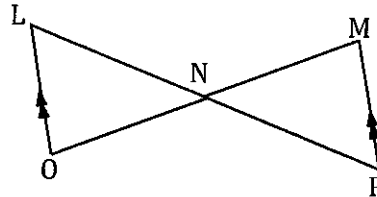
14. Given:  $\overline{AB} \cong \overline{DC}$ ,  $\overline{AB} \parallel \overline{DC}$ , and  $\overline{BC} \cong \overline{CE}$



Prove:  $\triangle ABC \cong \triangle DCE$

Statements	Reasons
1. $\overline{AB} \cong \overline{DC}$	1. Given
2.	2. Given
3.	3. Given
4.	4. Corresponding Angles
5. $\triangle ABC \cong \triangle DCE$	5.

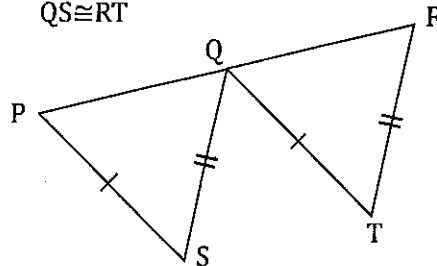
16. Given:  $\overline{LP}$  bisects  $\overline{MO}$ ,  $\overline{LO} \parallel \overline{MP}$



Prove:  $\triangle LNO \cong \triangle MNP$

Statements	Reasons
1.	1. Given
2.	2. Given
3. $\overline{LN} \cong \overline{PN}$	3.
4.	4. Alternate Interior
5.	5. Vertical Angles
6.	6. ASA

18. Given: Q is the midpoint of  $\overline{PR}$ ,  $\overline{PS} \cong \overline{QT}$  and  $\overline{QS} \cong \overline{RT}$



Prove:  $\triangle PQS \cong \triangle RQT$

Statements	Reasons
1.	1. Given
2.	2. Given
3. $\overline{QS} \cong \overline{RT}$	3.
4.	4. Midpoint
5. $\triangle PQS \cong \triangle RQT$	5.

# Similar Polygons

- ## Similar Polygons
1. Corresponding angles are congruent
  2. Corresponding sides are proportional

### Similarity Statement

$\triangle ABC \sim \triangle DEF$

Solve for x and y.

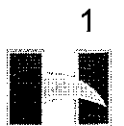
$\triangle ABC \sim \triangle SLT$

$$\frac{x}{13} = \frac{10}{5}$$

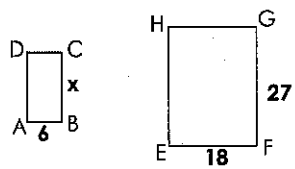
$$\frac{y}{24} = \frac{5}{10}$$

$x = 26 \text{ cm}$        $y = 12 \text{ cm}$

Essential Question: How are similar triangles different from congruent triangles?



**ABCD ~ EFGH. Solve for x.**

$$\frac{x}{27} = \frac{6}{18}$$


**x = 9**

**Ex.** A tree cast a shadow 18 feet long. At the same time a person who is 6 feet tall cast a shadow 4 feet long. How tall is the tree?

$$\frac{\text{tree's shadow}}{\text{person's shadow}} = \frac{\text{tree's height}}{\text{person's height}}$$

$$\frac{18}{4} = \frac{x}{6}$$

$$x = 27$$

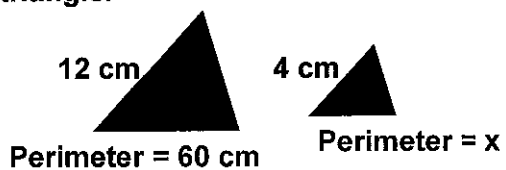
**Ratio of Similar Polygons**

Corresponding Sides : Corresponding Sides  
Or

**Perimeter : Perimeter**

**A : B**

**Find the perimeter of the smaller triangle.**



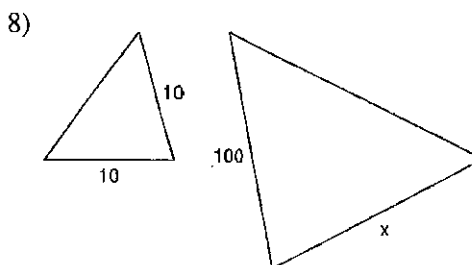
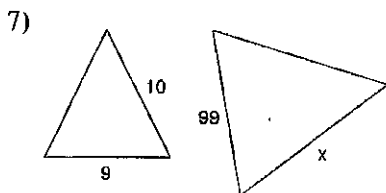
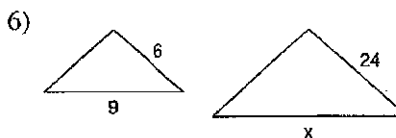
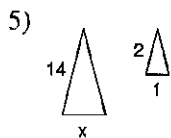
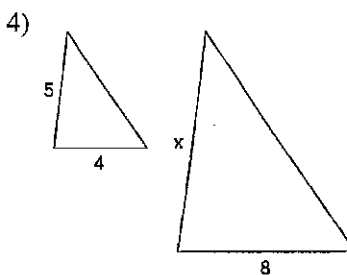
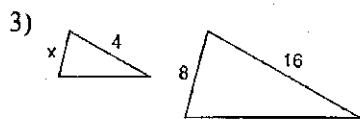
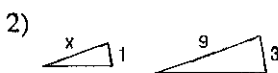
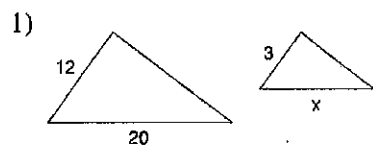
$$\frac{12}{60} = \frac{4}{x}$$

**x = 20 cm**

Essential Question: How are similar triangles different from congruent triangles?

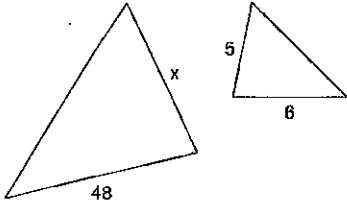
### Similar Figures

Each pair of figures is similar. Find the missing side.

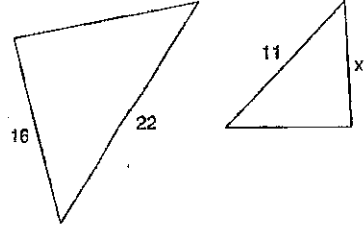




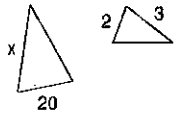
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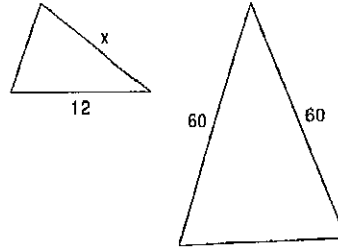
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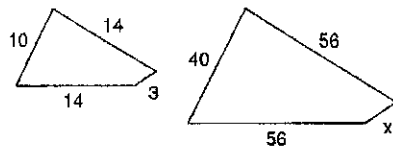
11)



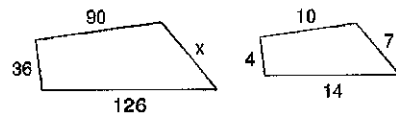
12)



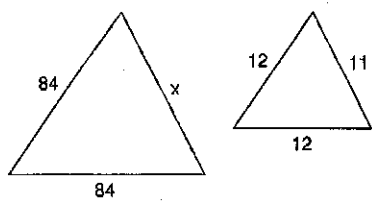
13)



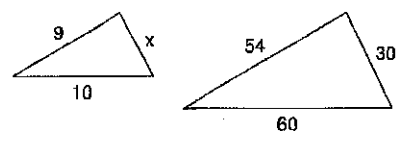
14)



15)



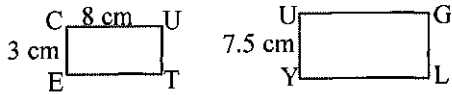
16)



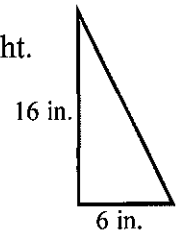
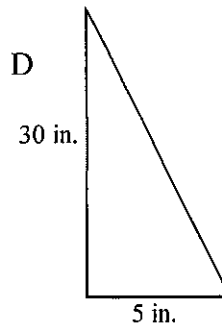
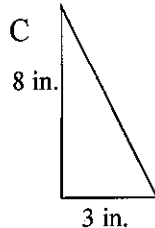
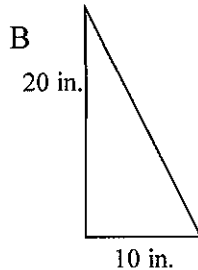
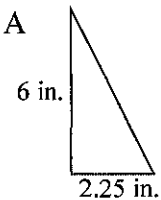
**SIMILARITY OF TRIANGLES**

**Dilations as Proportions Notes**

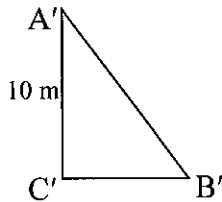
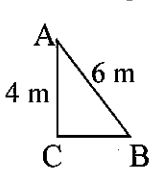
**Ex)** Rectangle CUTE was dilated to create rectangle UGLY. Find the length of LY.



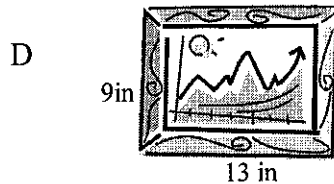
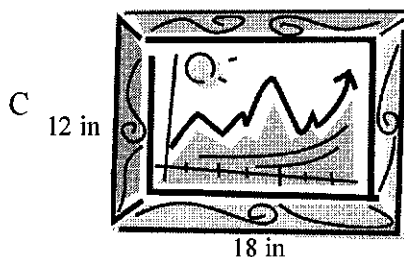
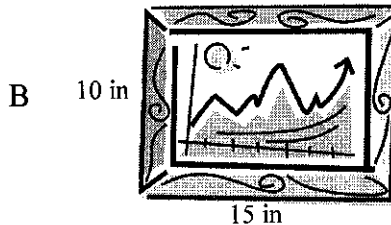
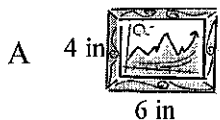
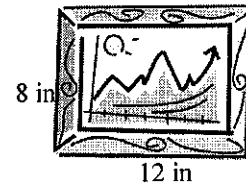
**Ex)** Determine which of the following figures could be a dilation of the triangle to the right. (There could be more than one answer)



1. Find the length of  $\overline{A'B'}$  after the dilation.



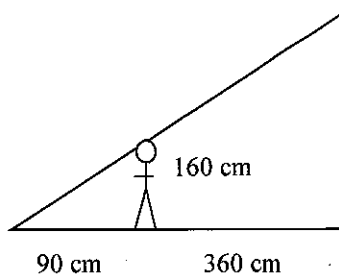
2. Which of the following could **NOT** be an enlargement or reduction (dilation) of the original painting shown at right?



**Word Problems:**

Write the equation for each and solve. Show all work.

1. Two rectangles are similar. The first is 4 in. wide and 15 in. long. The second is 9 in. wide.
  - a) Find the length of the second rectangle.
  - b) How do the perimeters of the two rectangles compare? How does this compare to the scale factor?
  - c) How do the areas of the two rectangles compare? How does this compare to the scale factor?
  
2. Two triangles are similar. The first has a base of 12 in. and a height of 8 in. The second has a base of 30 inches.
  - a) Find the height of the triangle.
  - b) How do the areas of the two triangles compare? How does this compare to the scale factor?
  
- 3) A girl 160 cm tall, stands 360 cm from a lamp post at night. Her shadow from the light is 90 cm long. How high is the lamp post?



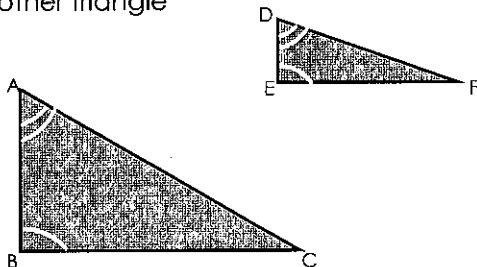
## 3 Ways to Prove Triangles Similar

### Similar Triangles

- If two triangles are **similar** then they have the same exact shape.
- They however, may be different sizes.

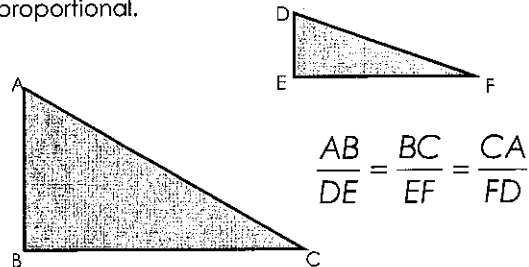
#### Angle-Angle (AA~) Similarity Postulate

Being able to show that two angles in one triangle are congruent to two angles of the other triangle



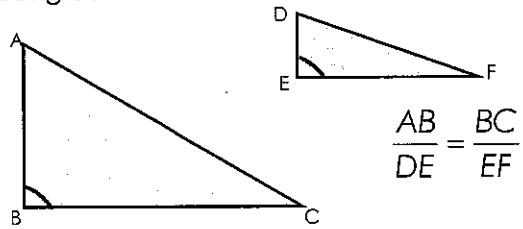
#### Side-Side-Side (SSS~) Similarity THM

Being able to show that the measures of all the corresponding sides of the triangles are proportional.

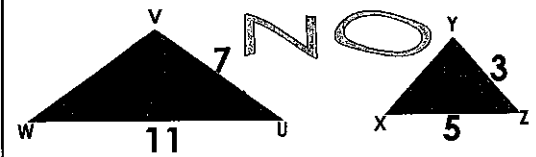


**Side-Angle-Side (SAS~) Similarity THM**

Being able to show that the measure of two pair of corresponding sides are proportional AND the included angles are congruent



Ex. Determine whether the triangles are similar. If so, tell which similarity test is used and complete the statement.



**Prove that  $\triangle RST \sim \triangle PSQ$**

**SAS~**

- Two sides are proportional ✓
- Included angle is congruent ✓

$$\frac{16}{4} = \frac{20}{5}$$

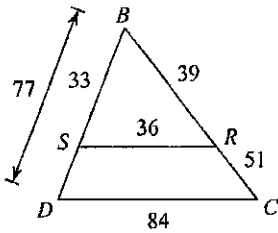
$$\frac{4}{1} = \frac{4}{1}$$

$\angle S \cong \angle S$   
reflexive

Proving Triangles Similar

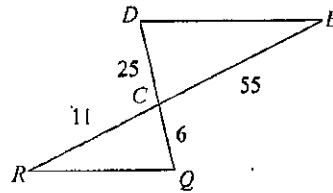
Decide if the triangles in each pair are similar. If so, state how you know they are similar by SSS~, SAS~, or AA~. Show all work.

1)



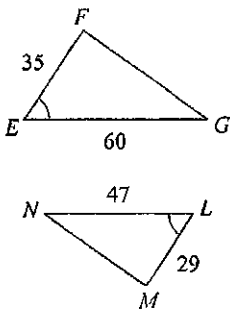
$\triangle ABC \sim$  \_\_\_\_\_

2)



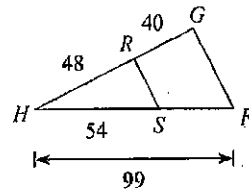
$\triangle CDE \sim$  \_\_\_\_\_

3)



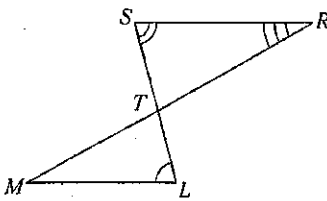
$\triangle EFG \sim$  \_\_\_\_\_

4)



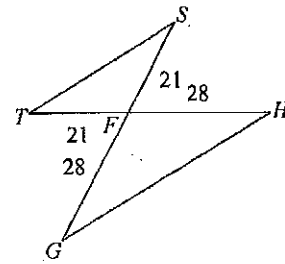
$\triangle HGF \sim$  \_\_\_\_\_

5)



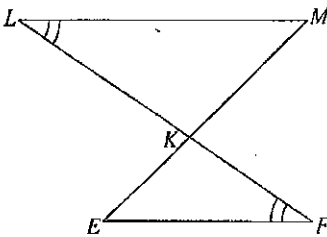
$\triangle TSR \sim$  \_\_\_\_\_

6)



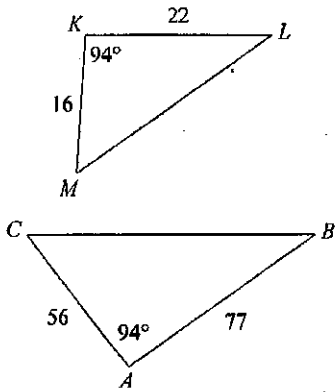
$\triangle FGH \sim$  \_\_\_\_\_

7)



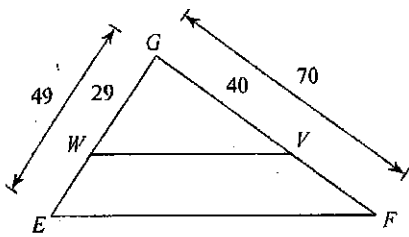
$\triangle KLM \sim$  \_\_\_\_\_

8)



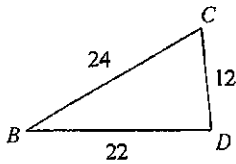
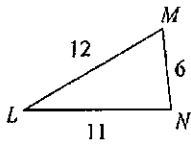
$\triangle ABC \sim$  \_\_\_\_\_

10)



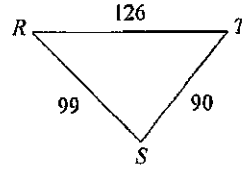
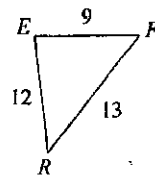
$\triangle GFE \sim$  \_\_\_\_\_

12)



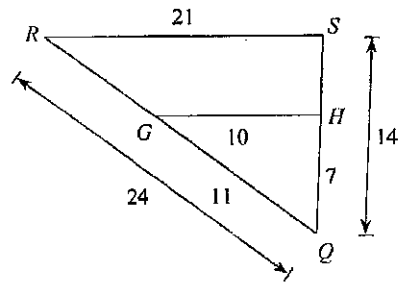
$\triangle BCD \sim$  \_\_\_\_\_

9)



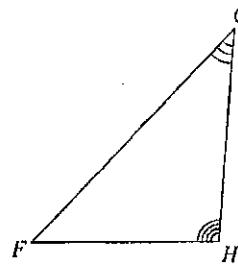
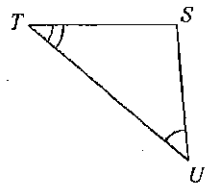
$\triangle RST \sim$  \_\_\_\_\_

11)



$\triangle QRS \sim$  \_\_\_\_\_

13)

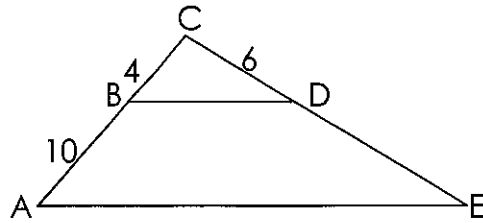


$\triangle FGH \sim$  \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Similarity Review – Homework**

1. Given  $\overline{BD} \parallel \overline{AE}$ , find DE and CE.



A model of a building has a scale of 2 in to 15 ft.

2. If the model is 5 in tall, how tall is the actual building?

In the diagram,  $\triangle CAT \sim \triangle DOG$ . Use the diagram to find each of the following.

3. Scale factor of  $\triangle CAT$  to  $\triangle DOG$  (Simplify if necessary)

Scale Factor = \_\_\_\_\_

4. Find x and y (Show Work!)

x = \_\_\_\_\_ y = \_\_\_\_\_

5. Find  $m\angle D =$  \_\_\_\_\_ $^\circ$

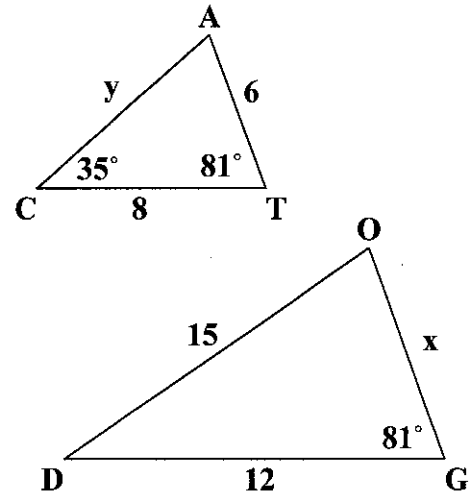
6. Find  $m\angle O =$  \_\_\_\_\_ $^\circ$

7. Find the perimeter of  $\triangle CAT =$  \_\_\_\_\_

Find the perimeter of  $\triangle DOG =$  \_\_\_\_\_

8. What is the ratio of the perimeter of  $\triangle CAT$  to the perimeter of  $\triangle DOG$ ?

\_\_\_\_\_

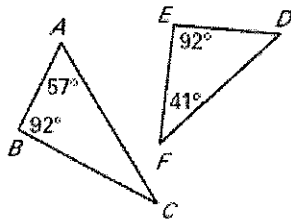


9. A boy who is 5 ft. tall cast a shadow that is 12 ft long. At the same time, a building nearby cast a shadow that is 72 ft long. How tall is the building? Draw a picture!

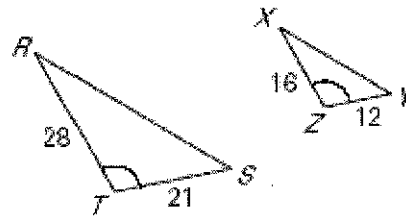


Explain why the triangles are similar and write a similarity statement.

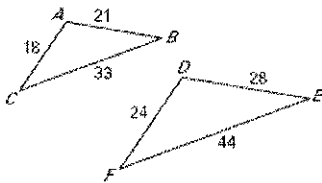
10.  $\triangle ABC \sim$  \_\_\_\_\_ by \_\_\_\_\_



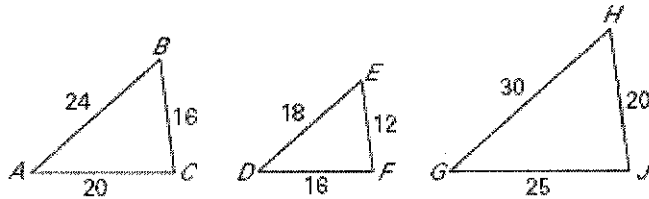
11.  $\triangle RST \sim$  \_\_\_\_\_ by \_\_\_\_\_



12.  $\triangle ABC \sim$  \_\_\_\_\_ by \_\_\_\_\_



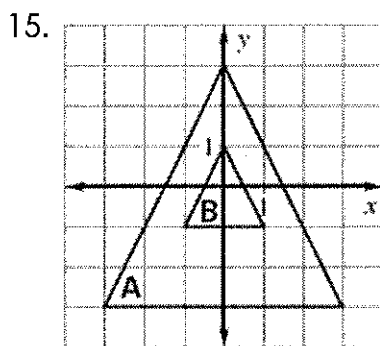
Determine which of the triangles ( $\triangle DEF$  or  $\triangle GHJ$ ) is similar to  $\triangle ABC$ :



13. Complete the Similarity Statement to  $\triangle ABC \sim \triangle$  \_\_\_\_\_

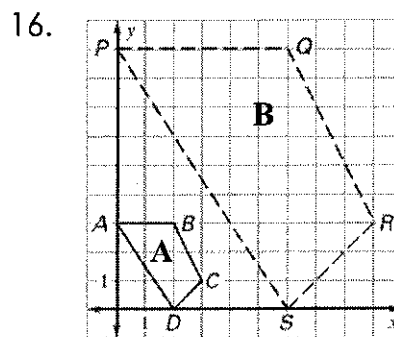
14. Find the Scale Factor = \_\_\_\_\_

Determine whether the dilation from Figure A to Figure B is a reduction or an enlargement. Then find its scale factor and simplify if possible.



Reduction or enlargement?

scale factor = \_\_\_\_\_



Reduction or enlargement?

scale factor = \_\_\_\_\_

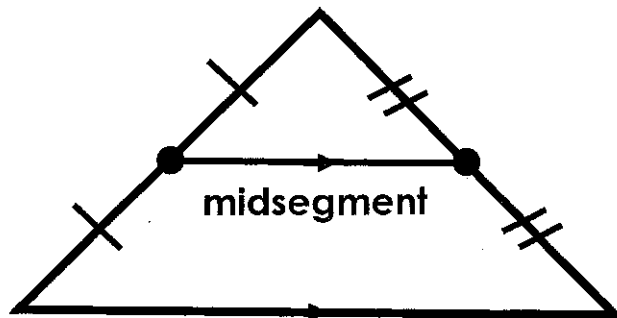
# Midsegment of a Triangle and Proportionality in Triangles



## Triangle Midsegment Theorem

## Triangle Midsegment

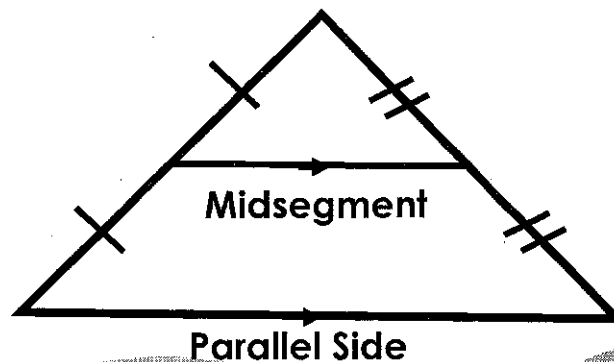
1. Parallel to one side of the triangle
2. Is half the length of the parallel side
3. Connects to the midpoints



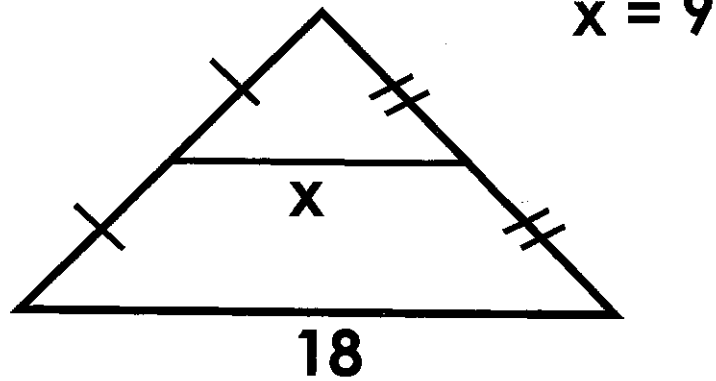
## Triangle Midsegment Theorem

EQUATION

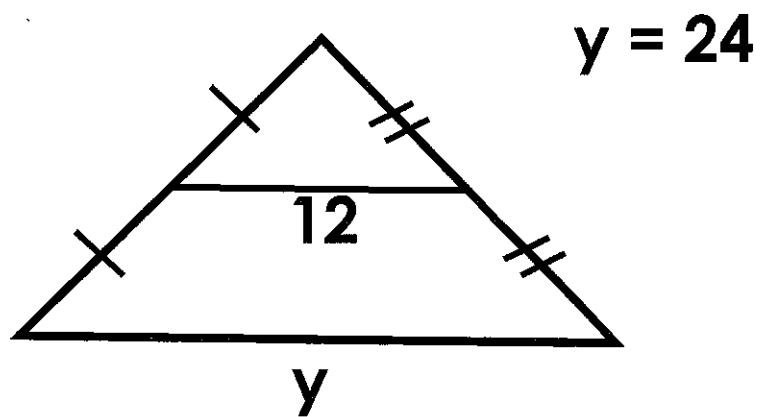
$$\text{MIDSEGMENT} = \frac{1}{2} \text{Parallel Side}$$



1. Solve for  $x$ .



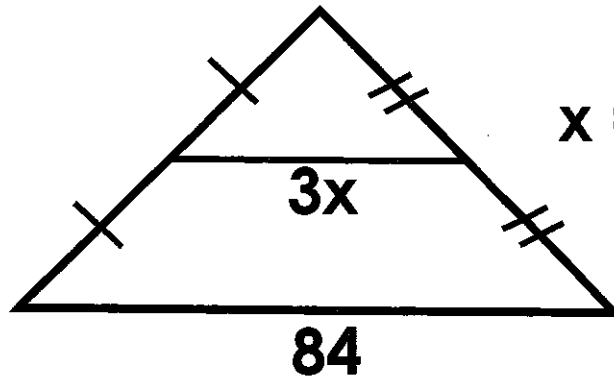
2. Solve for  $y$ .



**3. Solve for x.**

$$3x = \frac{1}{2}(84)$$

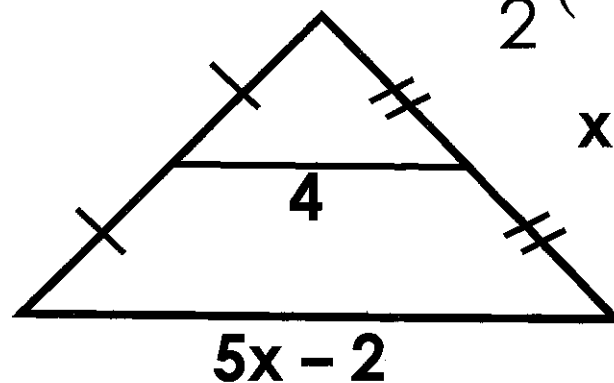
$$x = 14$$



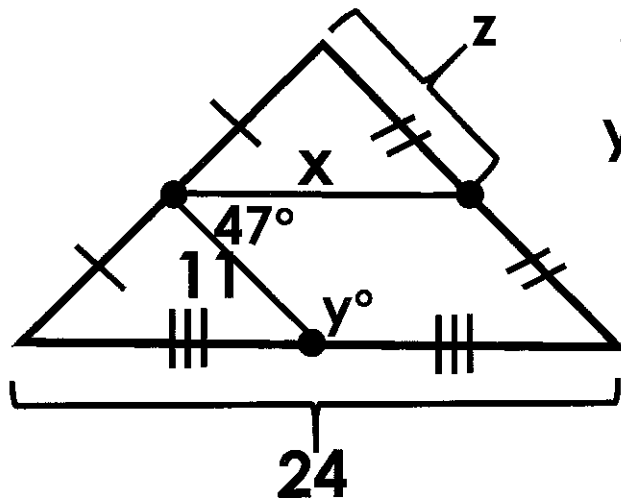
**4. Solve for x.**

$$4 = \frac{1}{2}(5x - 2)$$

$$x = 2$$



5. Solve for the missing variables.



$$x = 12$$

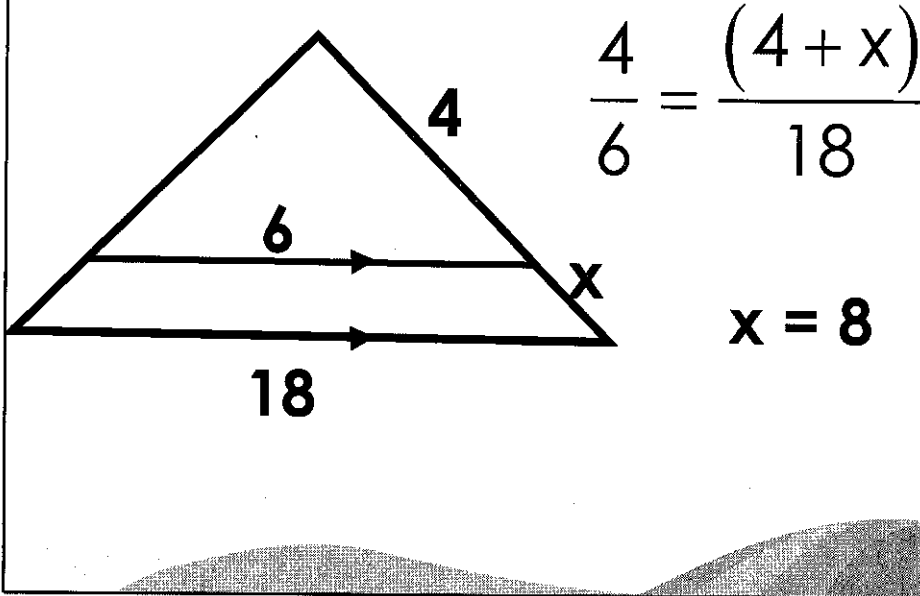
$$y = 133^\circ$$

$$z = 11$$

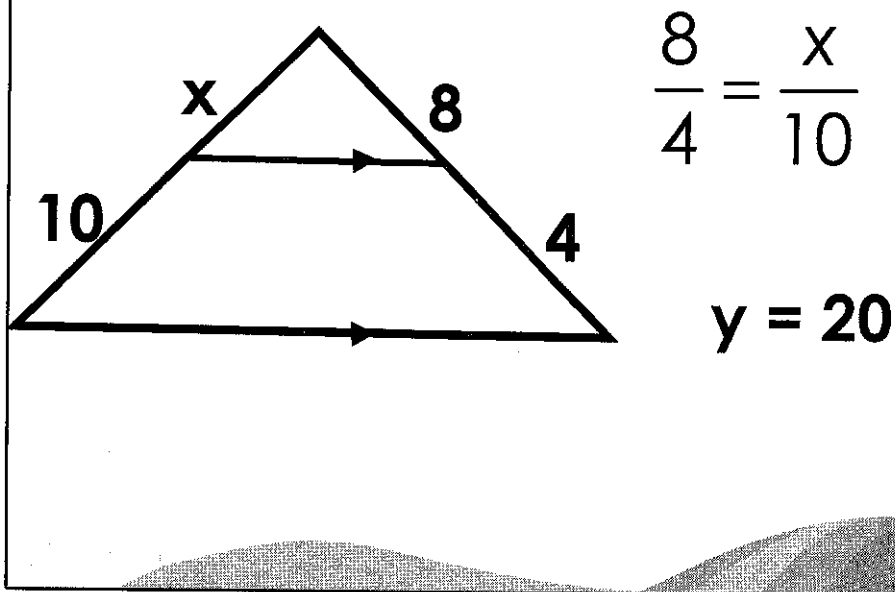
## Proportional Parts of Triangles

Be consistent with how you  
set up the proportion.

**6. Solve for x.**



**7. Solve for x.**

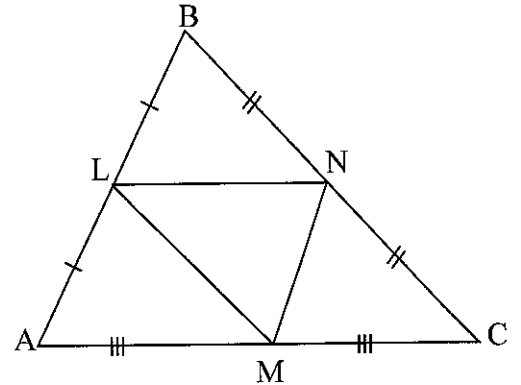


Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Triangle Midsegment and Proportionality Theorem**

**Triangle Midsegment Theorem:** The segment connecting the midpoints of two sides of the triangle is parallel to the third side and half the length of the third side.

Use  $\triangle ABC$ , where L, M, and N are midpoints of the sides.

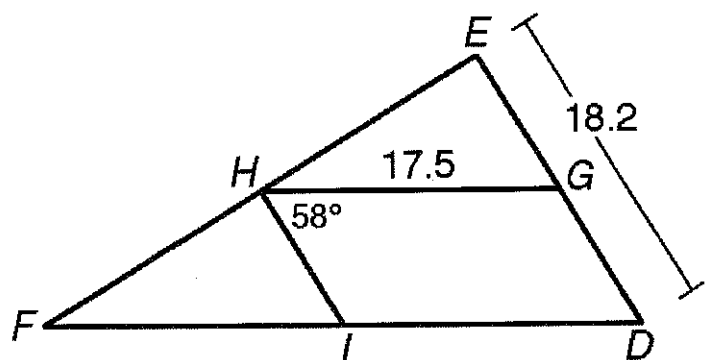


1.  $\overline{LM} \parallel$  \_\_\_\_\_
2.  $\overline{AB} \parallel$  \_\_\_\_\_
3. If  $AC = 20$ , then  $LN =$  \_\_\_\_\_
4. If  $MN = 7$ , then  $AB =$  \_\_\_\_\_
5. If  $NC = 9$ , then  $LM =$  \_\_\_\_\_
6. If  $LM = 3x + 7$ , and  $BC = 7x + 6$ , then  $LM =$  \_\_\_\_\_

7. If  $MN = x - 1$ , and  $AB = 6x - 1$ , then  $AB =$  \_\_\_\_\_

**8. Find each measure. H, G, and I are all midpoints.**

- |                        |                        |
|------------------------|------------------------|
| a) $HI$ _____          | b) $DF$ _____          |
| c) $GE$ _____          | d) $m\angle HIF$ _____ |
| e) $m\angle HGD$ _____ | f) $m\angle D$ _____   |

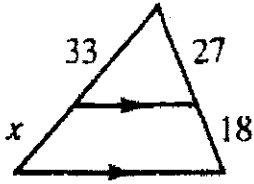




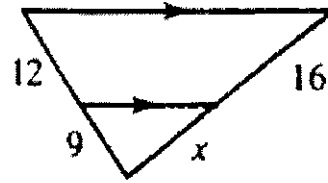
**Triangle Proportionality Theorem:** If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.

Find the value of  $x$ :

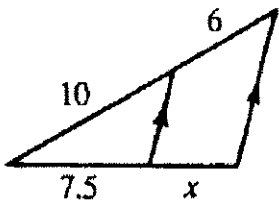
9.



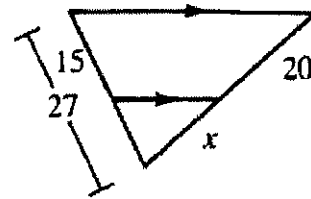
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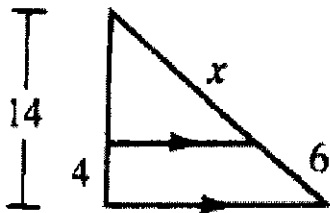
11.



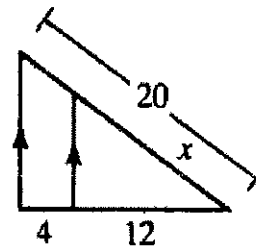
12.



13.

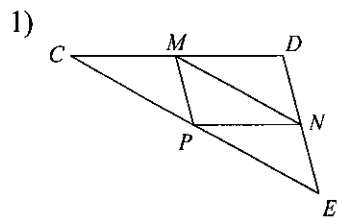


14.

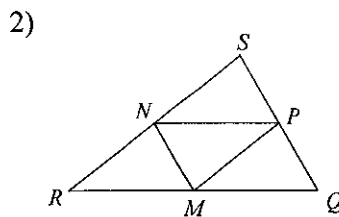


### Midsegment of a Triangle

In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.



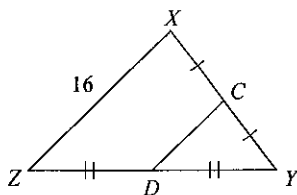
$\overline{CD} \parallel \underline{\hspace{1cm}}$



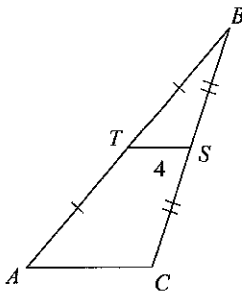
$\underline{\hspace{1cm}} \parallel \overline{QS}$

Find the missing length indicated.

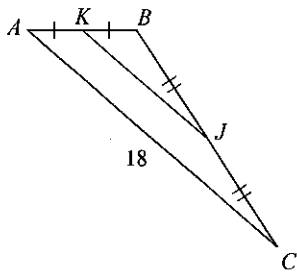
3) Find  $CD$



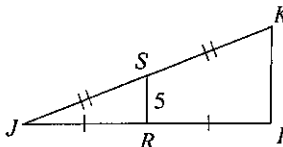
4) Find  $AC$



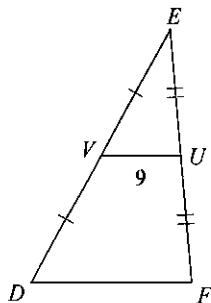
5) Find  $KJ$



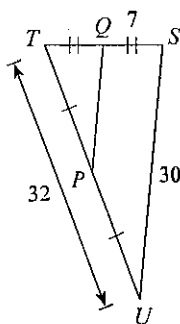
6) Find  $IK$



7) Find  $DF$

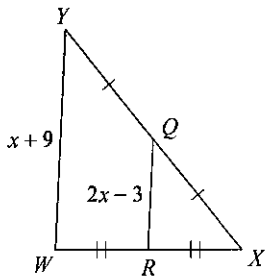


8) Find  $PQ$

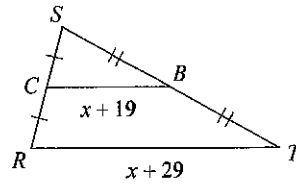


Solve for  $x$ .

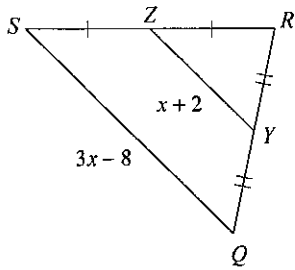
9)



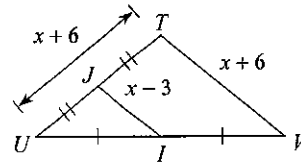
10)



11)

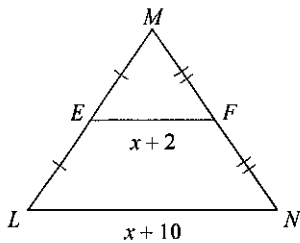


12)

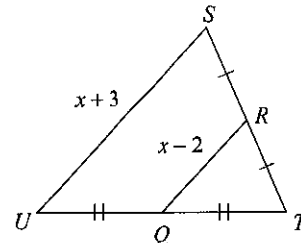


Find the missing length indicated.

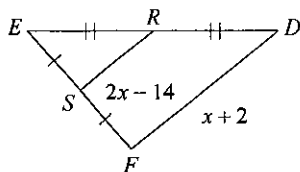
13) Find  $LN$



14) Find  $RQ$



15) Find  $SR$



16) Find  $VW$

