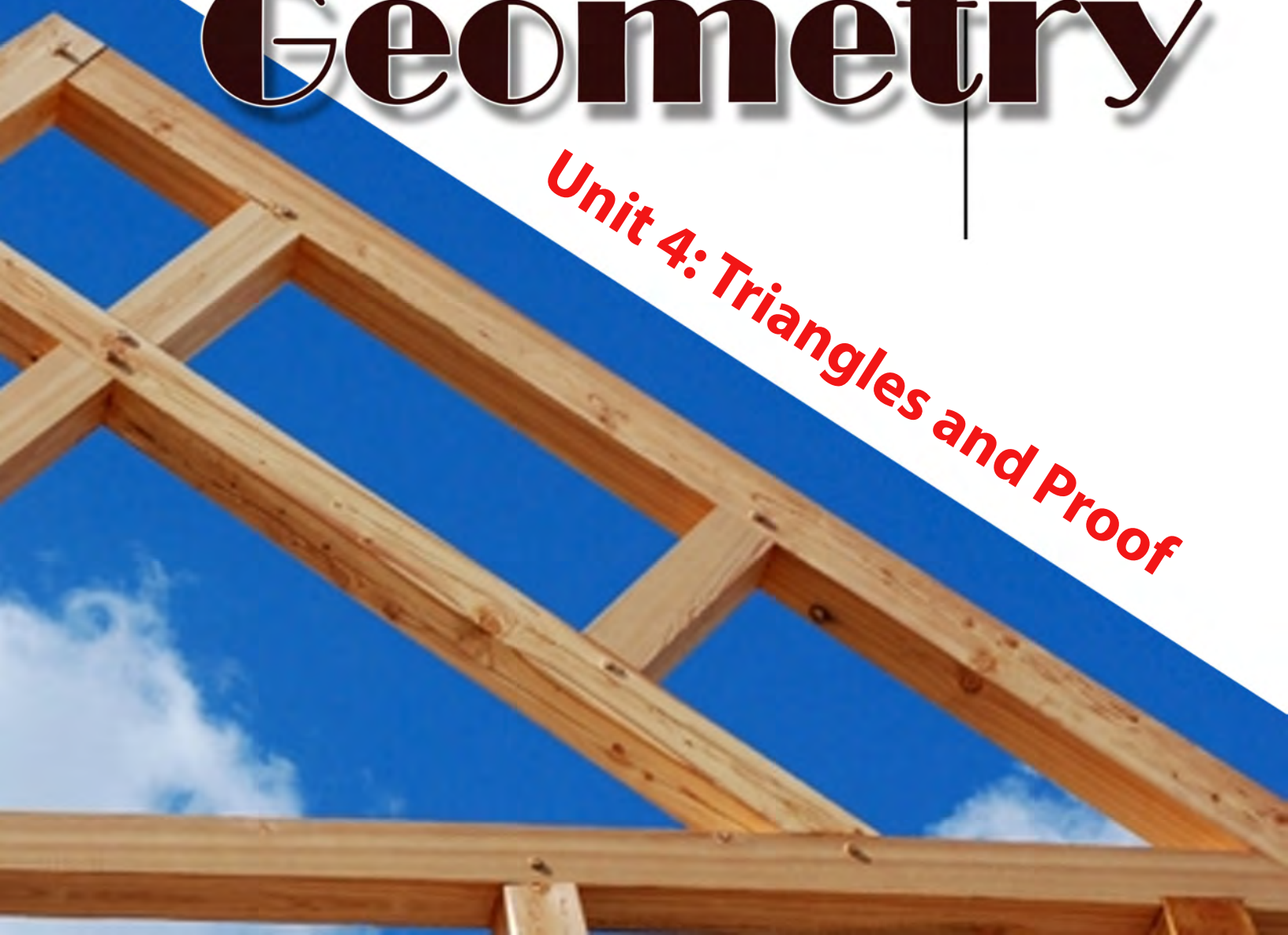
Geometry

Unit 4: Triangles and Proof



Geometry Outline - Fall

Unit 1: Basics of Geometry (Geometry ch.1)		
1A	***I understand and can describe the basic structures of geometric figures.***	POW: Rectangle
	1.1 Points, Lines, and Planes	
1B	***I can apply basic segment and angle properties to solve problems***	
	1.2/1.5 Measuring and Constructing Segments & Angles	
	1.6 Describing Pairs of Angles	
1C	***I can use coordinate geometry to find distance, length, perimeter, and areas***	
	1.3 Using Midpoint, Pythagorean Theorem, and Distance Formulas	
	1.4 Perimeter and Area in the Coordinate Plane	
Unit 2: Transformations (Geometry ch. 4)		
2A	***I can use rigid transformations to move geometric shapes on the coordinate plane and use coordinate rules and vectors to describe them***	POW: Overlapping Squares
	4.1 Translations	
	4.2 Reflections	
	4.3 Rotations	
2B	***I can use composite transformations to create congruent figures on the coordinate plane.***	
	4.4 Congruence and Transformations	
2C	***I can recognize and define dilations, and apply scale factor to problems.***	
	4.5 Dilations	
Unit 3: Graphing Quadratic Functions (Algebra ch. 8)		
3A	***I can graph transformations of quadratic functions.***	POW: Balancing Apples
	8.1 Graphing f(x)=ax^2	
	8.2 Graphing f(x)=ax^2+c	
	8.4 Graphing f(x)=a(x-h)^2+k	
3B	***I can apply the connections of other quadratic function forms and their graphs.***	
	8.5 Using Intercept Form	
	8.3 Graphing f(x)=ax^2+bx+c	
3C	***I can identify a function as Linear, Exponential, or Quadratic***	
	8.6 Comparing Linear, Exponential, and Quadratic Functions	
Unit 4: Proving Congruence (Algebra ch. 2&5)		
4A	***I can use mathematical reasoning to prove basic geometric theorems.***	POW: Three Circles and a Little Triangle
	2.5 Proving Statements about Segments and Angles	
	2.6 Proving Geometric Relationships	
4B	***I can apply triangle properties to find the measures of angles and sides in complex***	
	5.1 Angles of Triangles	
	5.4 Equilateral and Isosceles Triangles	
4C	***I can prove that two triangles are congruent using SSS, SAS, ASA, and AAS Theorems***	
	5.3 / 5.5 Proving Triangle Congruence by SAS and SSS	
	5.6 Proving Triangle Congruence by ASA and AAS	

Warmups and Startups

Warmups and Startups

Warmups

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Class Notes and Activities

Class Notes and Activities

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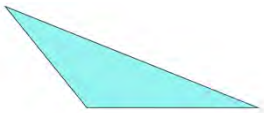
The Making of a Triangle



Triangles are one of the simplest shapes to make. Just put any three sides together and you have a triangle! But is this really true? Will any three segments make a triangle?

1. Try to form triangles with each set of side length measurements. Make sure each group member gets a turn to work with the materials. Record your results.

Small	Medium	Large	Does it form a triangle? Yes/No
2 in.	3 in.	4 in.	
2 in.	3 in.	5 in.	
2 in.	3 in.	7 in.	
2 in.	4 in.	5 in.	
2 in.	4 in.	8 in.	
2 in.	5 in.	7 in.	
2 in.	5 in.	8 in.	
2 in.	7 in.	8 in.	
3 in.	4 in.	5 in.	
3 in.	4 in.	7 in.	
3 in.	4 in.	8 in.	
3 in.	5 in.	7 in.	
3 in.	5 in.	8 in.	
3 in.	7 in.	8 in.	
4 in.	5 in.	7 in.	
4 in.	5 in.	8 in.	
5 in.	7 in.	8 in.	

2. Look at the measurements that **did not** form a triangle. What do you notice?

3. Look at the measurements that **did** form a triangle. What do you notice?

4. Is it possible to make a triangle that has side lengths of 14 ft., 20 ft. and 37 ft.? How do you know?

5. Can you find a set of lengths in the table where the triangle makes an obtuse angle?

Name: _____ Hour: _____ Date: _____

Lesson 4.1 – What Makes a Triangle?

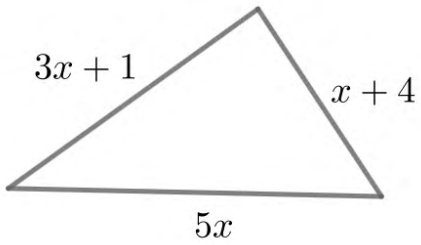
QuickNotes

Check Your Understanding

1. State if the three sides can form a triangle or not. Give a reason for your answer. Then decide if the triangle is scalene, isosceles, or equilateral.
   a) 4,5, 7 b) 5, 8, 5 c) 3, 5, 2 e) 21, 21, 21

2. Two sides of a triangle are 10 ft. and 15 ft. Give 3 possible options for the third side of the triangle.

3. (Multiple Choice) Which value of *x* would **NOT** work for this triangle?
   A. 2
   B. 3
   C. 4
   D. 5



4. Sketch the given type of triangle or explain why it can't be done. Add all necessary markings.
   a. Obtuse, isosceles triangle b. Equilateral, right triangle

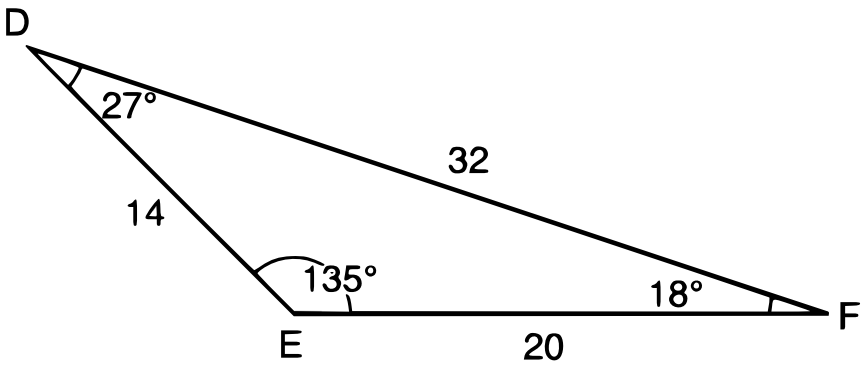
Geo Homework 4.1 Name _____

1. Determine whether or not the three given side lengths could form a triangle. Give a reason for your answer.

   a. 18 inches, 7 inches, 13 inches

   b. 9 feet, 4 feet, 13 feet

2. Classify $\triangle DEF$ by its angles and sides.



3. In $\triangle FOG$, $m\angle F = 27^\circ$, $m\angle O = m\angle F + 45$, and $m\angle G = 3m\angle F$. Classify $\triangle FOG$ as acute, obtuse, or right. Justify your answer.

4. Two sides of a triangle have lengths 8 and 3. The triangle is isosceles. Patrick says the third side could be either 8 or 3. Pria disagrees. Who is correct? Explain.

5. Sketch an acute, isosceles triangle or explain why it cannot be done.

6. The medium side length of a triangle is 7. The length of the longest side of the triangle is 11. If all three side lengths are whole numbers, what is the smallest possible perimeter of the triangle?

7. Determine if the statement is true or false. If true, explain why. If false, provide a counterexample.

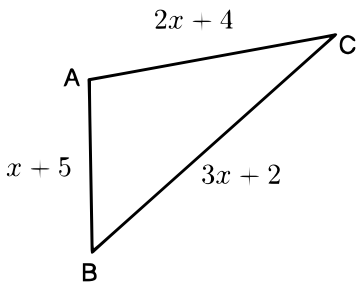
   If three segments are congruent, then they can always be arranged to form a triangle.

8. Two sides of a triangle have a length of 20 inches and 27 inches. Give three possible lengths for the third side of the triangle.

9. At Wild Wonders Amusement Park, the Ferris Wheel, Lazy Pool, and Bumper Cars form the vertices of a triangle. The Ferris Wheel is 340 yards away from the Bumper Cars and the Bumper Cars are 400 yards away from the Lazy Pool. Give the range of possible distances between the Ferris Wheel and the Lazy Pool.

10. a. Prove that for all positive values of x , these three side lengths will form a triangle.

    b. For which values of x will BC be the longest side?



The triangle shown is not drawn to scale.

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What's the Magic Number?

We've seen some relationships between the side lengths of a triangle. Now we will look at the angles of the triangle.

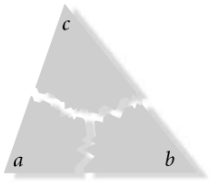
1. Assign each member of your group to draw either an acute or an obtuse triangle. Make sure both types of triangles are represented in your group. Draw your triangle below.

2. Use your protractor to carefully measure all three angles. Write the measure of each angle in the appropriate spot in your picture.

3. Find the sum of the measures of the three angles in your triangle. Write it below. Compare the results with others in your group. What do you notice? Write down your conjecture.

4. Let's see if we can prove it! Trace your triangle onto patty paper. Label the angles *a*, *b*, and *c*, and carefully cut out the triangle.

5. Tear off the three angles as shown. Arrange them so that all three corners meet at one point. Tape your arrangement to the paper in the space below. How does this arrangement show the sum of the three angles of a triangle?



6. Go back to your original triangle in question 1 and use a ruler to extend one side past the vertex. What is the measure of the new angle made on the outside of the triangle?

7. How does the outside angle relate to the other angles inside the triangle? Why do you think this is?

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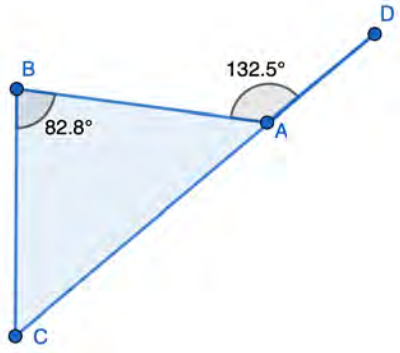
Lesson 4.2 – Triangle Properties

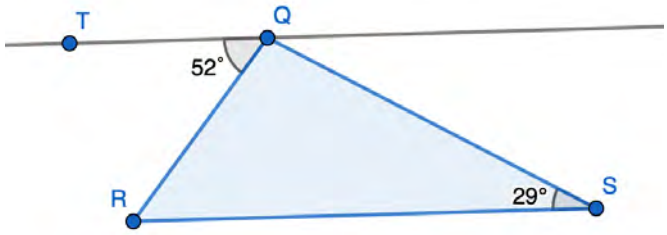
QuickNotes

Check Your Understanding

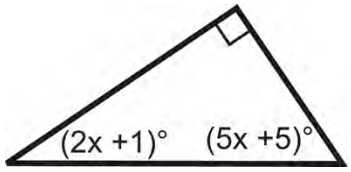
1. Find $m\angle C$ and $m\angle BAC$.



2. If $\overline{RS} \parallel \overleftrightarrow{TQ}$, find $m\angle RQS$.

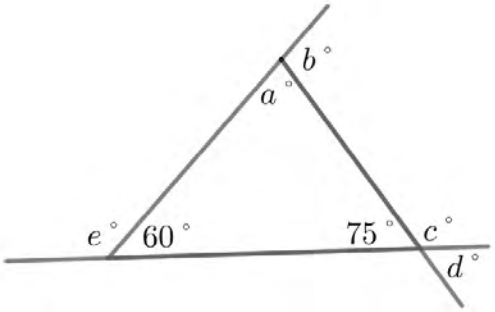


3. Solve for *x*.



4. (Multiple Choice) In the figure shown, which of the following is the greatest?

A. *a*
B. *b*
C. *c*
D. *d*
E. *e*



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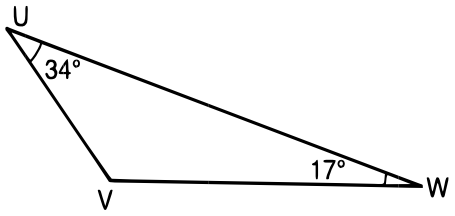
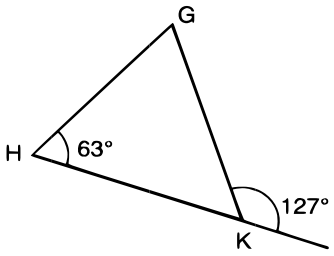
Geo Homework 4.2

Name _____

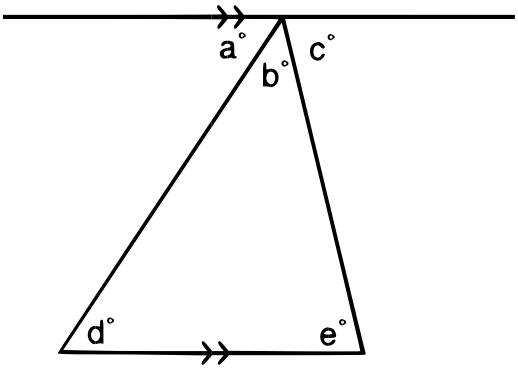
1. Find $m\angle V$.



2. Find $m\angle G$.



3. Which of following statement(s) must be true?

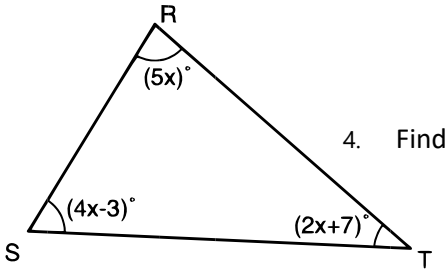


A) $a = e$

B) $d + e = a + c$

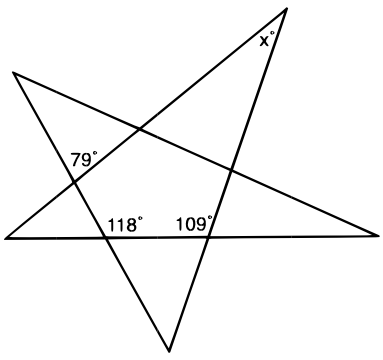
C) $d = e$

D) $a = d + e$



4. Find the value of x and $m\angle S$.

5. Find the value of x.



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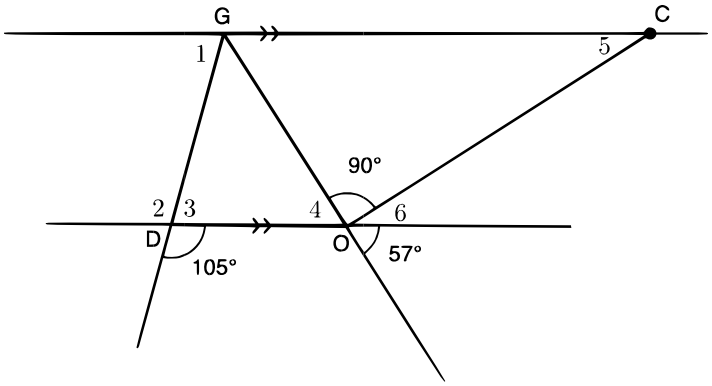
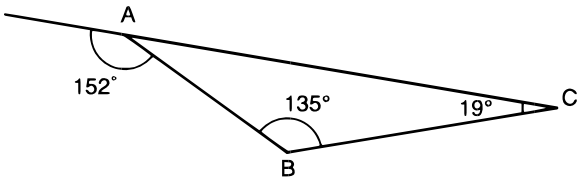
6. In triangle *ABC*, the measure of $\angle B$ is twice the measure of $\angle A$ and the measure of $\angle C$ is 10° more than the measure of $\angle B$. Find the measure of $\angle B$.

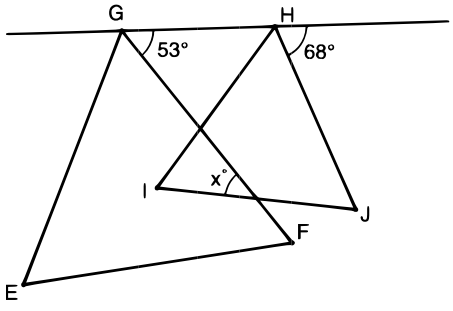
7. Find the measure of angles 1 through 6.



8. Triangle *ABC* is shown. What is wrong with this picture?



9. $\triangle GEF$ and $\triangle HIJ$ are equilateral triangles. Find the value of *x*.



10. The measures of the angles in a triangle are in a ratio of 1 : 4 : 5 . Find the measure of the largest angle.

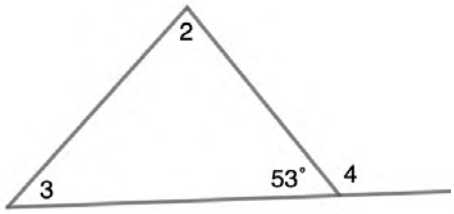
Name: _____ Hour: _____ Date: _____

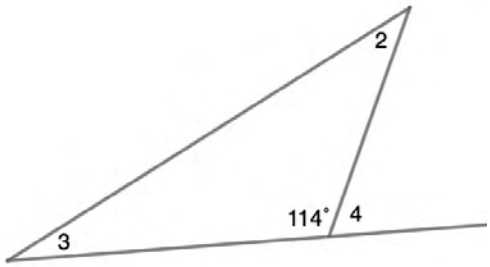
PROOF

How Do We Prove It?

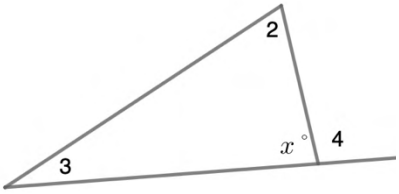
Yesterday you made a conjecture about how the measure of the exterior angle is related to the other angles in the triangle. But even if we had 100 examples, we still can't be certain that the conjecture holds for *all* triangles. We need a proof!

1. Find the measure of $\angle 4$ in each triangle.

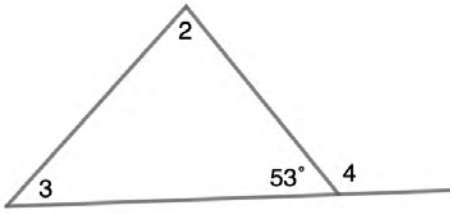


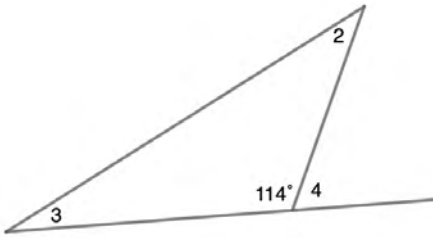


2. Find the measure of $\angle 4$. How do you know?

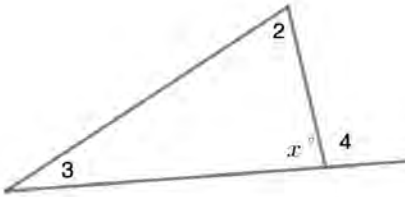


3. Find the sum of $\angle 2$ and $\angle 3$ in each triangle.





4. Find the sum of $\angle 2$ and $\angle 3$. How do you know?



5. Explain how this proves that our Exterior Angle Conjecture *always* works.

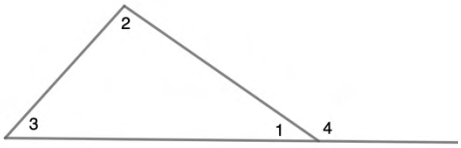
Name: _____ Hour: _____ Date: _____

Lesson 4.3 – Proving the Exterior Angle Conjecture

QuickNotes

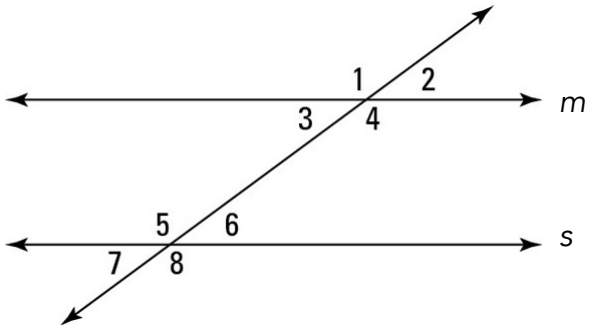
Check Your Understanding

1. Fill in the missing statements and reasons to prove that the sum of the angles in a triangle is always 180°.



$m\angle 1+m\angle 4=180^\circ$	
	Substitution
Exterior Angle Theorem	

2. Lines *m* and *s* are parallel. Prove that $\angle 5$ and $\angle 2$ are supplementary. Remember to give reasons for every statement you make.



Guiding Questions:
- How is $\angle 5$ related to $\angle 6$?
- How is $\angle 6$ related to $\angle 2$?
- How is $\angle 5$ is related to $\angle 2$?

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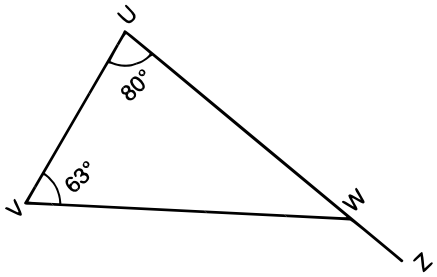
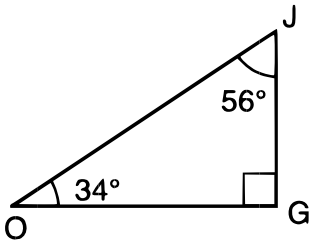
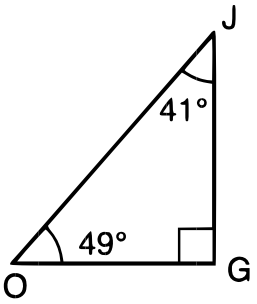
Geo Homework 4.3 Name _____

1. Find $m\angle VWZ$. Show your reasoning.



2. $\triangle JOG$ is a right triangle with a right angle at vertex G. Hannah drew two triangles that match this description.



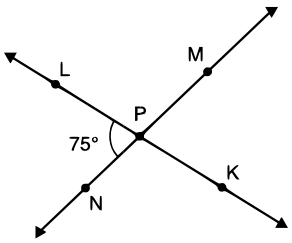


   a. Find $m\angle J + m\angle O$ in the first triangle.

   b. Find $m\angle J + m\angle O$ in the second triangle.

   c. Explain why $\angle J$ and $\angle O$ are always complementary.

3. Benny is asked to show that $m\angle MPK = 75°$. One way is by using the fact that vertical angles are congruent. Show it in another way.

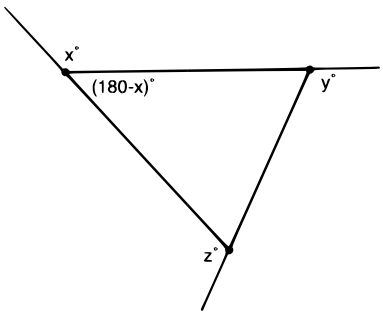


4. Suppose you want to prove that $x + y + z = 360$.

   a. One of the angles of the triangle shown in the figure has measure $(180 - x)°$. Label the measures of the other two angles of the triangle.

   b. Write an expression for the sum of the measures of the three angles in the triangle and combine any like terms.

   c. Show how to use your expression from part B to prove that $x + y + z = 360$.



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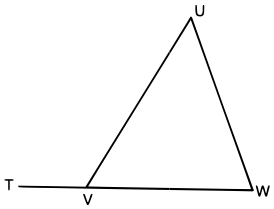
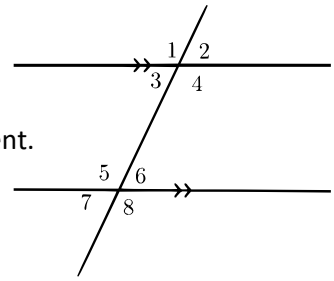
5. In the figure below, what reasoning could be used to support the statement " $m\angle TVU + m\angle UVW = 180°$ "?

A) Exterior angle theorem
B) Vertical angles are congruent
C) Linear pairs are supplementary
D) The sum of the measures of the angles in a triangle is 180°



6. In the figure below, what reason could be used to support the statement " $\angle 1 \cong \angle 8$ "?

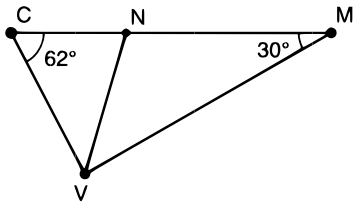
A) Vertical angles are congruent.
B) If a transversal intersects parallel lines, alternate exterior angles are congruent.
C) Corresponding angles are always congruent.
D) Definition of alternate exterior angles.



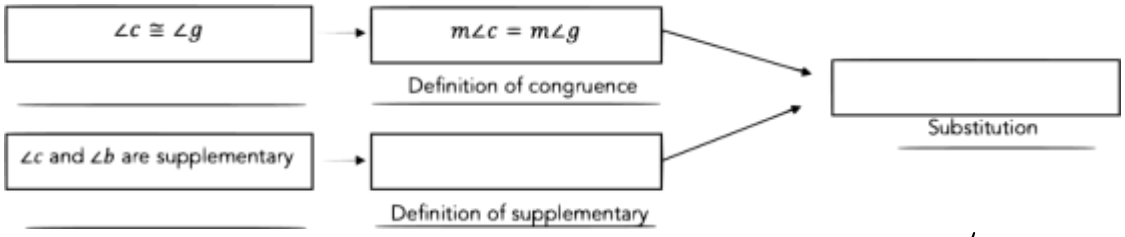
7. In the figure shown, $\overline{VN}$ is the angle bisector of $\angle CVM$. Prove that $\angle VNM = 106^{\circ}$. In your response, be sure to address all the guiding questions.

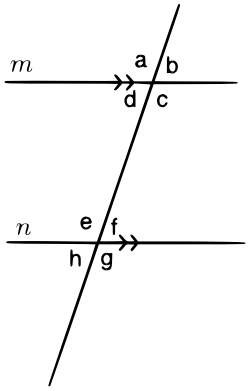
a. What is $m\angle CVM$? How do you know?

b. What is $m\angle NVM$? How do you know?
c. What is $\angle VNM$? How do you know?



8. Lines m and n are parallel. Fill in the missing statements and reasons to prove that $m\angle b + m\angle g = 180°$.





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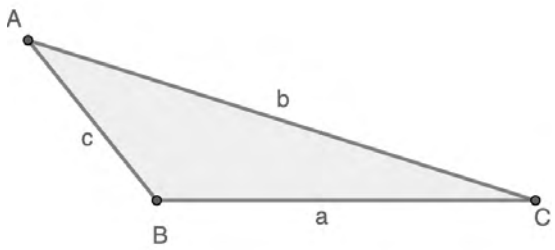
Name: _____ Hour: _____ Date: _____

Relatively Speaking

We've looked at the sides and the angles of various triangles over the past few days and classified triangles based on these features. But are they connected in any way? Do the angles affect the sides? Do the sides affect the angles? Let's explore.

1. Without doing any measuring, which **side** in the triangle do you *estimate* to be the longest? The shortest?



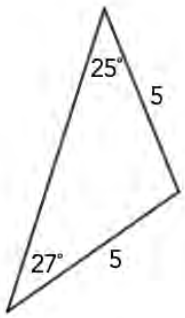
2. Without doing any measuring, which **angle** in the triangle do you *estimate* to be the biggest? The smallest?

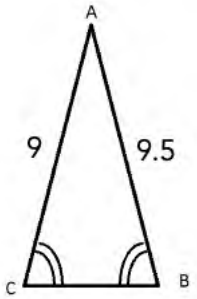
3. Let's see if your predictions are correct! Use your ruler and protractor to fill in the table.

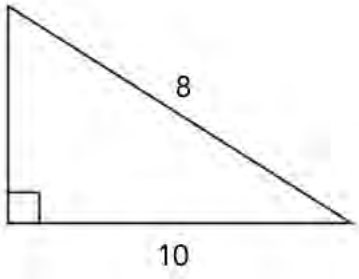
$a=$	$b=$	$c=$
$m\angle A =$	$m\angle B =$	$m\angle C =$

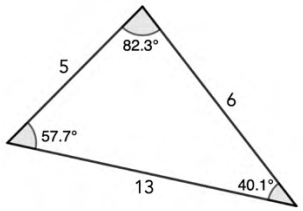
4. What conjecture can you make about where the biggest side is in relation to where the biggest angle is?

5. Explain why each of the triangles below **cannot** exist.









MATH MEDIC

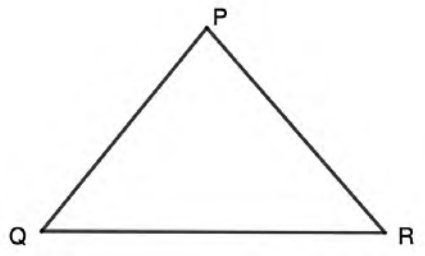
Name: _____ Hour: _____ Date: _____

Lesson 4.4 – Angle Side Relationships in Triangles

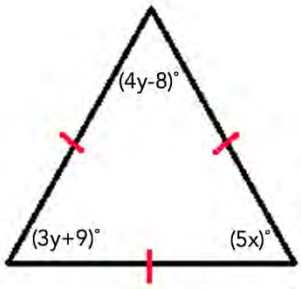
QuickNotes

Check Your Understanding

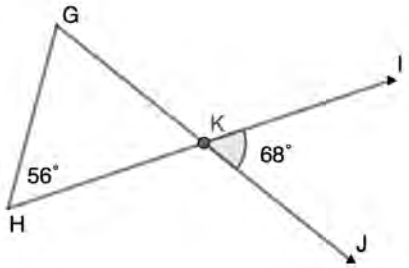
1. In the triangle shown, $PQ = 5.6, PR = 6.1,$ and $QR = 5.2$. Without a protractor, put the angles in order from smallest to greatest.



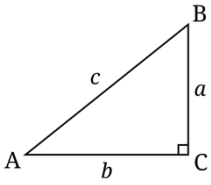
2. Find the value of *x+y*.



3. Explain why ΔGHK is isosceles.



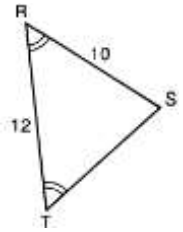
4. Prove that the hypotenuse is always the longest side of a right triangle. The rubric shown will help you make sure you have included all necessary elements.



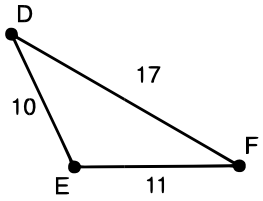
- uses definition of right triangle
- explains why ∠A and ∠B are each less than 90°
- locates longest side using the side-angle relationship
- uses definition of hypotenuse

Geo Homework 4.4 Name _____

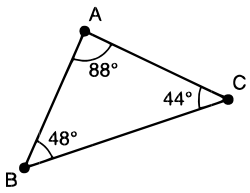
1. Find the length of $\overline{ST}$.



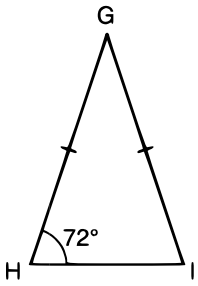
2. Order the angles in $\triangle DEF$ from smallest to largest.



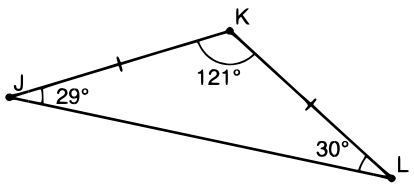
3. Order the sides in $\triangle ABC$ from largest to smallest.



4. Find $m\angle G$.



5. What is wrong with this picture?



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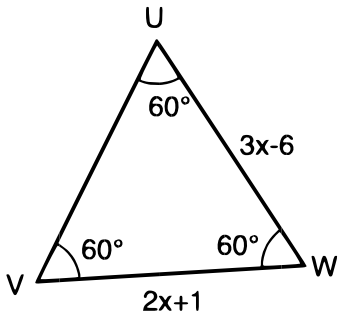
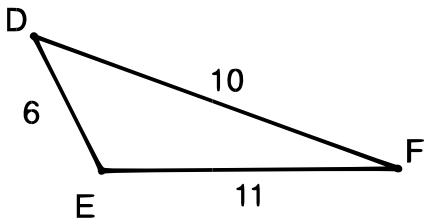
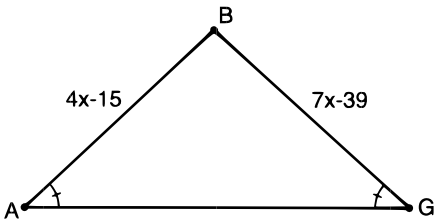
6. Find $\overline{UV}$.



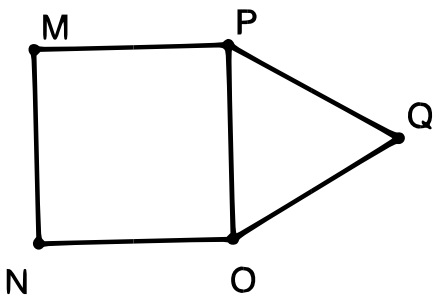
7. What is wrong with this picture?



8. Find the length of $\overline{BG}$.



9. *PMNO* is a square and *PQO* is an equilateral triangle. Find $m\angle NOQ$.



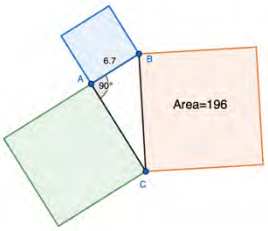
Name: _____ Hour: _____ Date: _____

Lesson 4.5 – Right Triangles & Pythagorean Theorem

QuickNotes

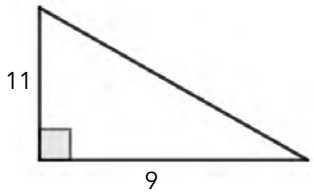
Check Your Understanding

1. Three squares are shown. Find the area of the square made from side $\overline{AC}$.

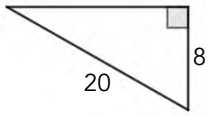


2. Solve for the missing side in the triangle. Round to the nearest hundredth.

a.

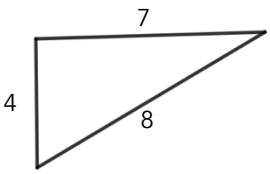


b.



3. Determine if the triangle with the given side lengths is right, acute, or obtuse. Justify.

a.



b. 9, 15, 12

4. If the area of an isosceles right triangle is 72, find the length of the hypotenuse.

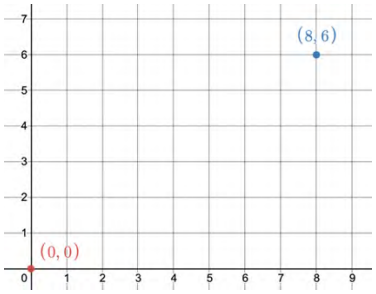
Name: _____ Hour: _____ Date: _____

Lesson 4.6 – Coordinate Connection: Distance

QuickNotes

Check Your Understanding

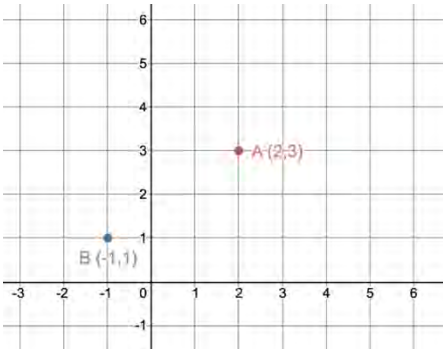
1. Find the distance between the two ordered pairs.



2. Consider the points (-5,2) and (3, -9).
   a. What's the horizontal distance between the two points?
   b. What's the vertical distance between the two points?
   c. What's the actual (shortest) distance between the two points?

3. If the distance between the points (-6,-3) and (-1, *a*) is 13, find the value of *a*.

4. Find three different locations for a new point *C*, such that $\overline{AB} \cong \overline{AC}$.



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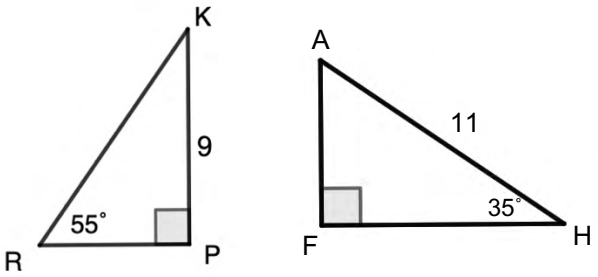
Name: _____ Hour: _____ Date: _____

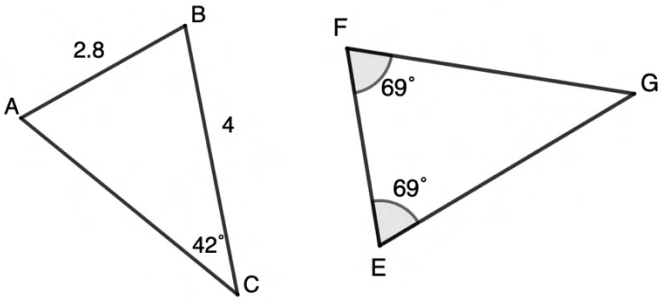
Dealing with Parts and Wholes

Now that we know so many things about the relationships within a triangle, we can turn our attention to the relationships between triangles. Specifically, what does it mean for two triangles to be congruent and how can we prove it?

1. The two triangles are congruent. Find all missing sides and angles of each triangle.

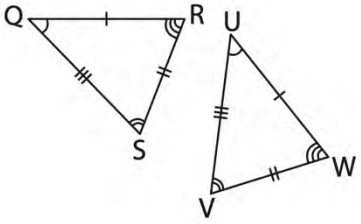


2. The two triangles are congruent. Find the perimeter of ΔGFE.

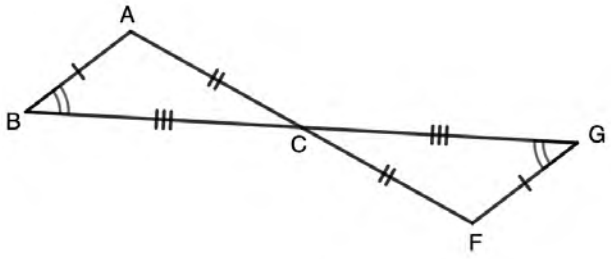


3. Is there enough information to determine if the two triangles are congruent? Explain.

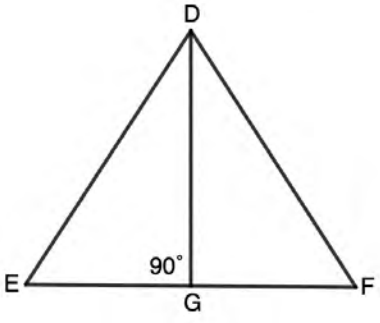
a.



b.



4. $\overline{DG}$ is the bisector of $\overline{EF}$. Mark everything you know in the figure. Is there enough information to determine if ΔDEG is congruent to ΔDFG? Explain.



MATH MEDIC

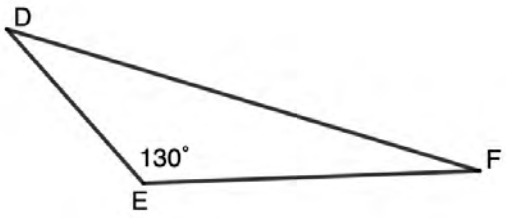
Name: _____ Hour: _____ Date: _____

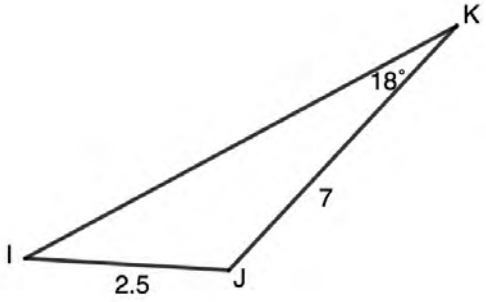
Lesson 4.7 – Establishing Congruent Parts in Triangles

QuickNotes

Check Your Understanding

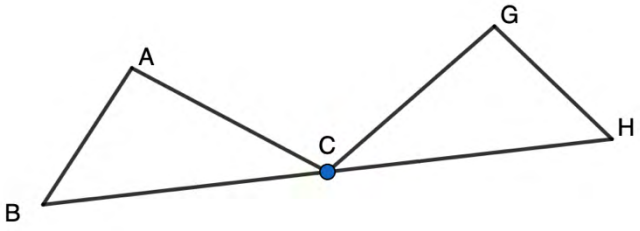
1. The two triangles are congruent. Find *EF* and m∠D. Then write a triangle congruence statement.



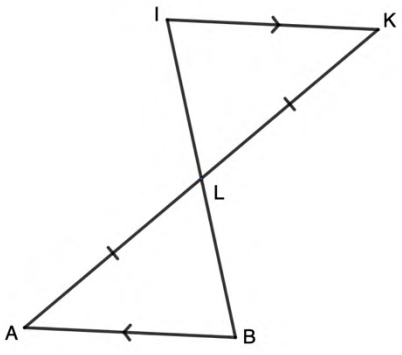


2. Use the information given to mark the congruent parts in the diagram.

$m\angle ABC \cong m\angle GHC$
$\overline{AC} \cong \overline{GC}$
C is the midpoint of $\overline{BH}$



3. For each of the Statements, write the Reason on the line underneath. If something is already marked, write "Given".



$m\angle ILK \cong m\angle BLA$

_____

$\overline{KL} \cong \overline{AL}$

_____

$m\angle IKL \cong m\angle BAL$

_____

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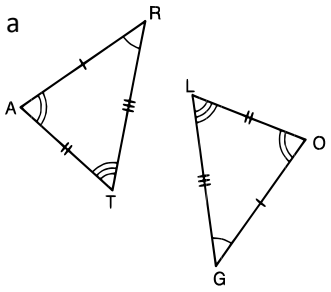
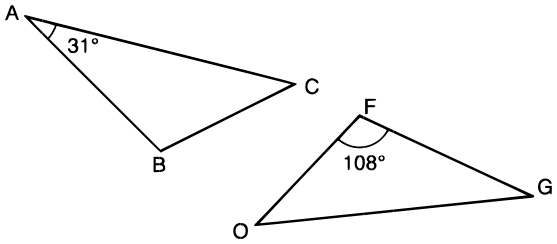
Geo Homework 4.7 Name _____

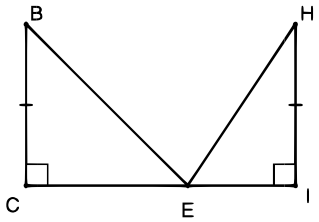
1. Are the two triangles congruent? Why or why not? If they are congruent, write a congruence statement.



2. $\triangle ABC \cong \triangle GFO$. Find $m\angle O$.



3. Is $\triangle BCE \cong \triangle HIE$? Explain how you know.



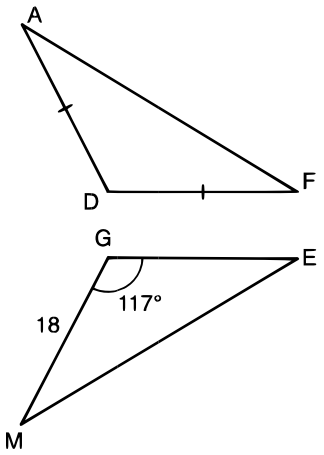
4. $\triangle LIP$ is an acute, scalene triangle and $\triangle LIP \cong \triangle SAD$. Draw a possible sketch of these two triangles and include all the congruence markings.

5. The triangles shown are congruent.

   a. Find *GE*.

   b. Find $m\angle F$.

   c. Find *DF*.



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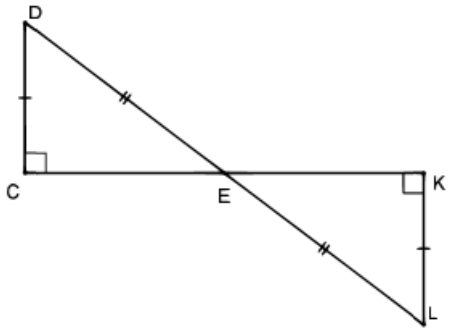
6. A figure is shown. Based on the information shown in the figure, give a reason that justifies each statement.



a. $\overline{DC} \cong \overline{LK}$

b. $\overline{DE} \cong \overline{LE}$

c. $\overline{CE} \cong \overline{KE}$

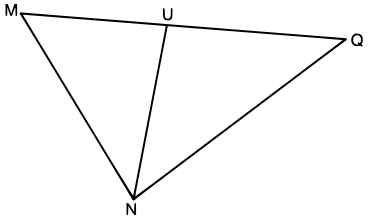
d. $\angle C \cong \angle K$

e. $\angle CED \cong \angle KEL$

f. $\angle D \cong \angle L$

g. What can you conclude about $\triangle DCE$ and $\triangle LKE$?

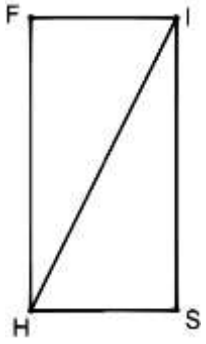
7. $\triangle MUN$ and $\triangle QUN$ are shown below. $\overline{NU}$ is the angle bisector of $\angle MNQ$.



a. Mark any congruent parts of $\triangle MUN$ and $\triangle QUN$.

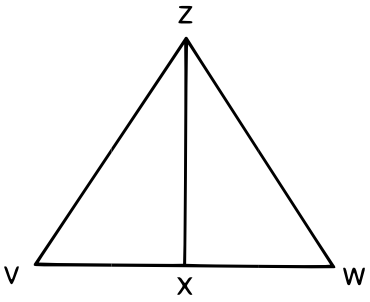
b. Do you have enough information to conclude that $\triangle MUN \cong \triangle QUN$? Explain.

8. Given rectangle *FISH*, Anaiah is trying to prove that $\triangle FHI \cong \triangle SIH$. What reason could she use to support the statement $\overline{HI} \cong \overline{IH}$?



A) Definition of a rectangle
B) Reflexive property
C) CPCTC
D) Triangle angle sum theorem

9. In the figure shown, $\overline{ZX} \perp \overline{VW}$ and X is the midpoint of $\overline{VW}$.



a. Mark the figure to show what is given in the statements above.

b. Is $\overline{ZV} \cong \overline{ZW}$? How do you know?

c. Is $\angle V \cong \angle W$? How do you know?

d. Do you have enough information to conclude that $\triangle ZVW \cong \triangle ZWX$? Explain.

Name: _____ Hour: _____ Date: _____

Builders for Hire!

Your teacher will give you some specific criteria for building various triangles. Write down the required elements, then use rulers, yard sticks, patty paper, wire, wooden skewers, protractors, or other classroom supplies to build or draw that triangle. When you're satisfied with your construction, call your teacher over to get it approved and move on to your next building project.

1. Building Project 1

   Must have:

2. Building Project 2

   Must have:

3. Building Project 3

   Must have:

4. After your gallery walk of other groups' building projects, answer the questions below.
   a. Compare the triangles each group made for Building Project 1. What do you notice?

   b. Compare the triangles each group made for Building Project 2. What do you notice?

   c. Compare the triangles each group made for Building Project 3. What do you notice?

   d. Which set of building criteria were specific enough so that each group built the same standardized triangle?

5. Imagine you were coming up with the criteria for Building Project 4. Specify a set of measurements so that all groups will make congruent triangles. What is the minimum number of criteria you need? Why?

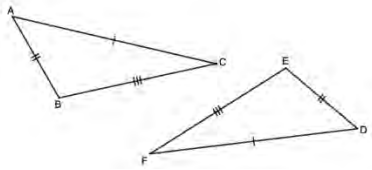
Name: _____ Hour: _____ Date: _____

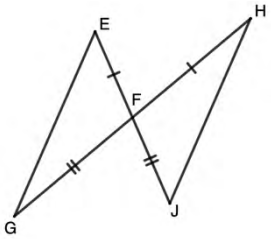
Lesson 4.8 – Triangle Congruence Shortcuts

QuickNotes

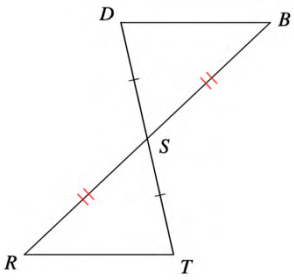
Check Your Understanding

1. Determine if the triangles are congruent. If so, write a congruence statement and justify your answer using one of the triangle congruence conjectures. If not, explain why not.

a. 

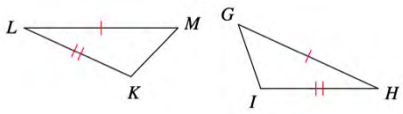
b. 

2. Fill in the missing statements and reasons to prove that the two triangles are congruent. If something is already marked, write "Given".

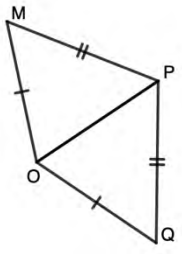


$\overline{DS} \cong \overline{TS}$	Given
	Vertical angles are congruent
	Given
Δ _____ $\cong \Delta$ _____	SAS Conjecture

3. What additional information is needed to prove that the two triangles are congruent using SAS?



4. Is $\angle M \cong \angle Q$? How do you know?



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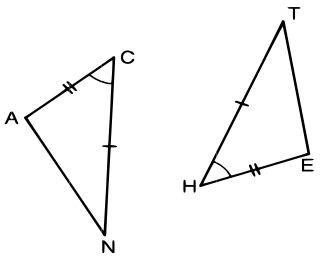
Geo Homework 4.8 Name _____

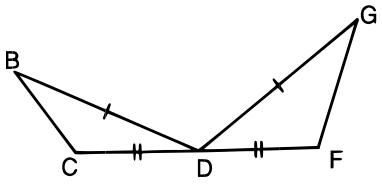
1. Explain why SSS and SAS are considered triangle congruence shortcuts.

2. Determine if the triangles are congruent. If so, write a congruence statement and justify your answer using one of the triangle congruence conjectures. If not, explain why not.

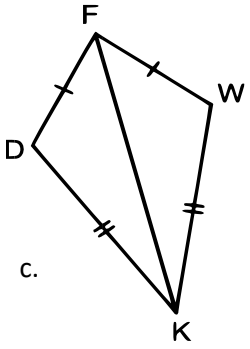
a.



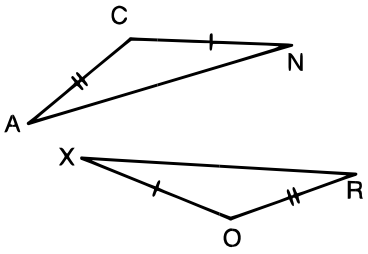
b.



c.



3. Consider $\triangle ANC$ and $\triangle RXO$ shown.



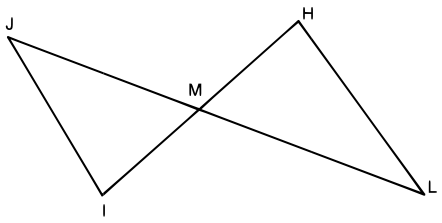
a. What additional information is needed to prove that $\triangle ANC \cong \triangle RXO$ using the SSS congruence conjecture?

b. What additional information is needed to prove that $\triangle ANC \cong \triangle RXO$ using the SAS congruence conjecture?

4. Ms. Brown asked each student in the class to construct a triangle *ABC* where $\overline{AB}$ = 3 inches, $\overline{BC}$ = 4 inches, and $\overline{AC}$ = 5 inches. She did not specify any of the angles. How many different triangles are possible that meet these criteria?

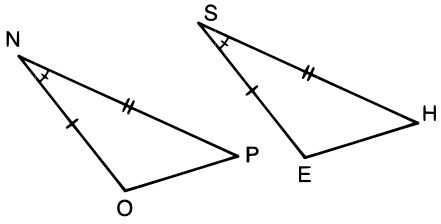
A) None because these side lengths will not make a triangle.
B) Exactly one.
C) Two.
D) Infinitely many.

5. M is the midpoint of $\overline{IH}$ and $\overline{JL}$.

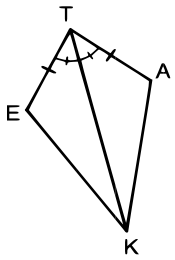


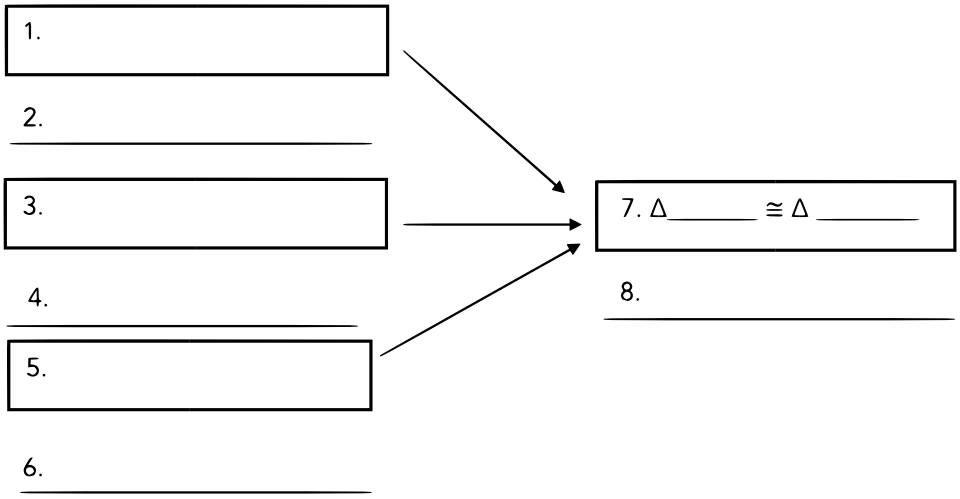
a. Mark the given information in the diagram.
b. Is this enough information to prove that $\triangle JIL \cong \triangle LHM$? Explain why or why not.

6. Is $\overline{OP} \cong \overline{EH}$? Explain why or why not.



7. Fill in the missing statements and reasons to complete the flowchart proof to prove that $\triangle TEK \cong \triangle TAK$. If the information was given to you in the problem, write "Given" as the reason.





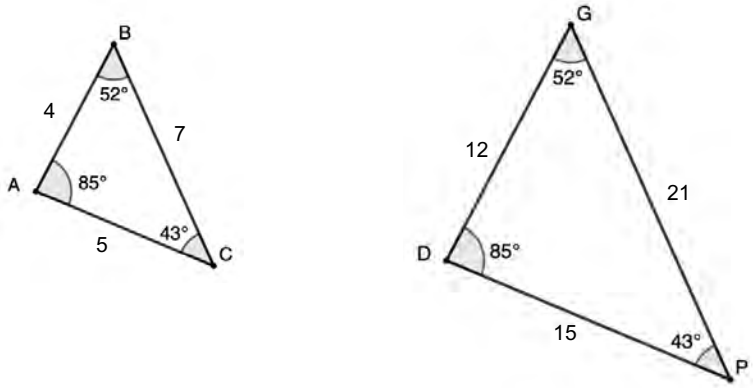
Name: _____ Hour: _____ Date: _____

Essentials Only!

Mathematicians figure out what's essential and learn how to eliminate or ignore what's not. Yesterday we found that knowing just a few measurements was enough to determine if two triangles are congruent. Are there other essentials? Let's find out!

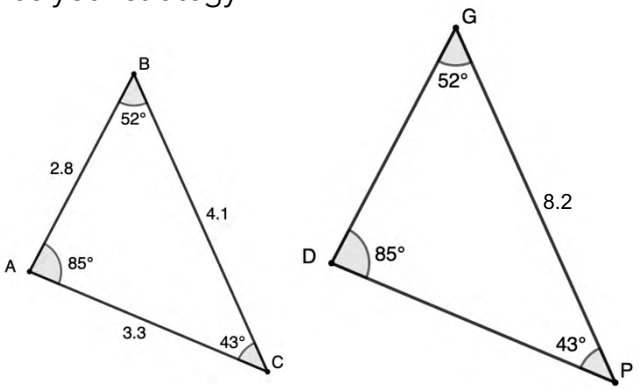
Note that the triangles in these problems are not drawn to scale, so you won't be able to rely on ruler measurements or "eyeballing".

1. Look at the two triangles shown. What is the same about the two triangles? What is different?



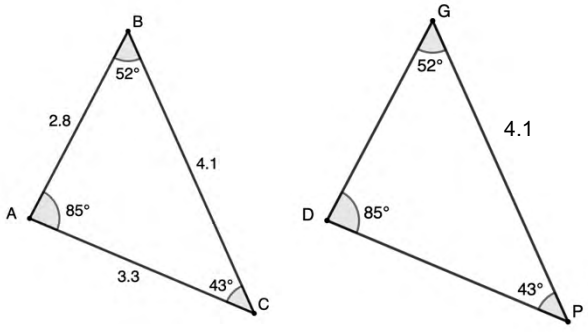
2. Work out the missing sides in ΔGDP. What was your strategy?

   Are the two triangles congruent? How do you know?



3. Find the missing sides in ΔGDP.

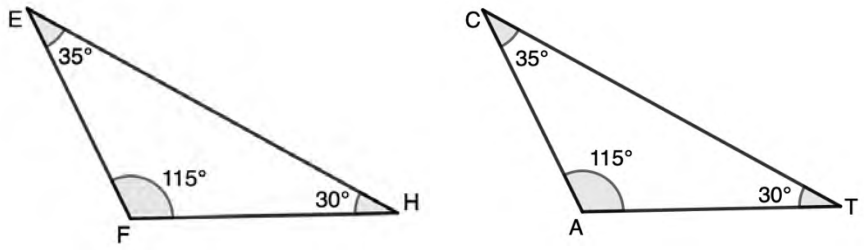
   Are the two triangles congruent? How do you know?



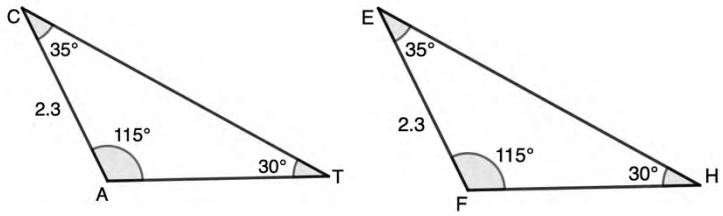
MATH MEDIC

Name: _____ Hour: _____ Date: _____

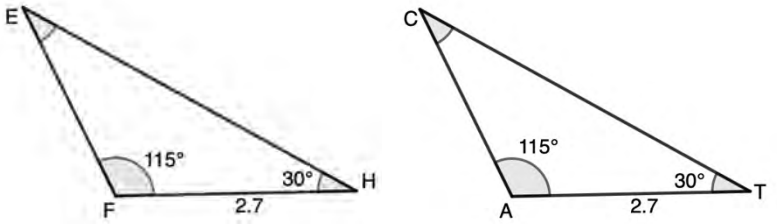
4. Is there enough information to determine if the triangles are congruent? Explain.



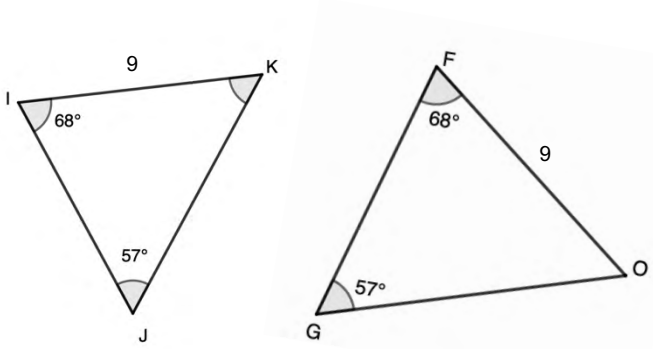
5. Is there enough information to determine if the triangles are congruent? Explain.



6. Is there enough information to determine if the triangles are congruent? Explain.



7. Are the two triangles congruent? How do you know?



8. What information turned out to be *essential* in order to establish that two triangles have the same shape AND the same size?

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Name: _____ Hour: _____ Date: _____

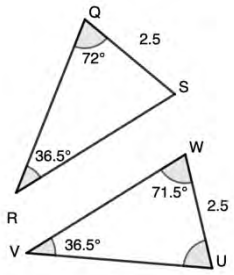
Lesson 4.9 – More Triangle Congruence Shortcuts

QuickNotes

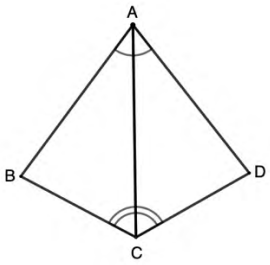
Check Your Understanding

1. Determine if the triangles are congruent. If so, write a congruence statement and justify your answer using one of the triangle congruence conjectures. If not, explain why not.

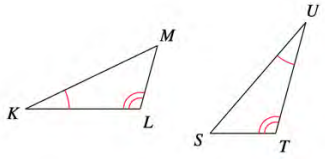
a.



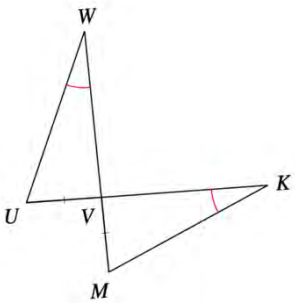
b.



2. What additional information is needed to prove the triangles are congruent by ASA?



3. Fill in the missing statements and reasons to prove that the two triangles are congruent. If something is already marked, write "Given".



$\angle UWV \cong \angle MKW$	
	Δ _____ $\cong \Delta$ _____
Given	

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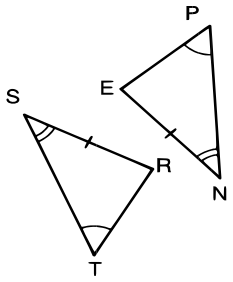
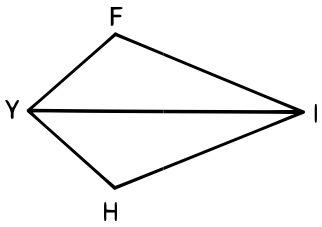
Geo Homework 4.9

Name _____

1. Is there enough information to prove that $\triangle SRT \cong \triangle NEP$? Explain.



2. In the figure shown, $\overline{YI}$ is the angle bisector of $\angle FYH$ and the angle bisector of $\angle FIH$.
   a. Mark this information in the diagram.
   b. Is there enough information to prove that $\triangle FYI \cong \triangle HYI$? Explain.



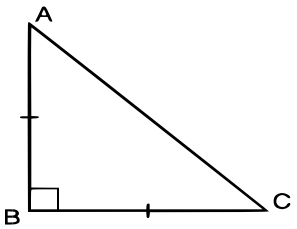
3. Ms. Dreieck wants all her students to draw the same triangle. Determine if each set of directions would fulfill her goal. Give a reason for your answer.
   a. $\overline{AB} = 9$ cm, $\overline{BC} = 21$ cm, $\overline{AC} = 13$ cm

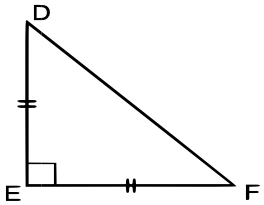
   b. $m\angle X = 28°$, $m\angle Y = 77°$, $m\angle Z = 75°$

   c. $\overline{XY} = 13$, $m\angle Y = 59°$, $m\angle Z = 46°$

   d. $\overline{CD} = 16$ in, $\overline{ED} = 13$ in, $m\angle E = 63°$

4. Consider $\triangle ABC$ and $\triangle DEF$ shown below.





   Kelsie says that $\triangle ABC \cong \triangle DEF$ because both triangles have a 90° angle and two 45° angles.

   Katie says that $\triangle ABC \cong \triangle DEF$ by the SAS Congruence Conjecture.

   Katarina says that there is not enough information to prove that $\triangle ABC \cong \triangle DEF$.

   Which of these students, if any, is correct? Explain.

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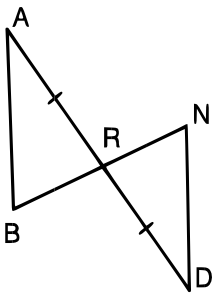
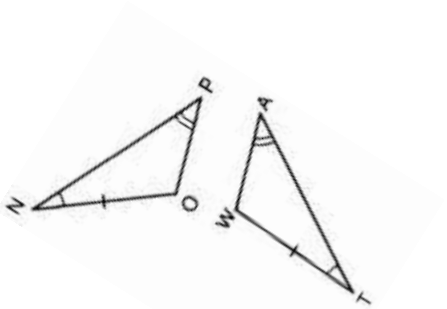
5. Consider $\triangle ARB$ and $\triangle DRN$ shown.



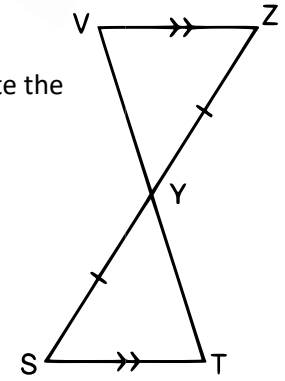
   a. What additional information is needed to prove that $\triangle ARB \cong \triangle DRN$ using the SAS congruence conjecture?

   b. What additional information is needed to prove that $\triangle ARB \cong \triangle DRN$ using the ASA congruence conjecture?

6. Is $\overline{OP} \cong \overline{WA}$? Explain why or why not.

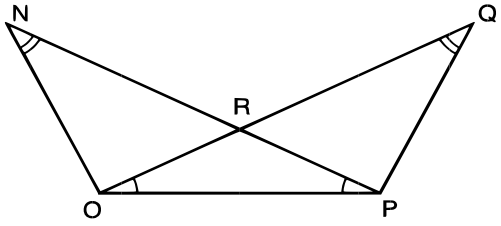


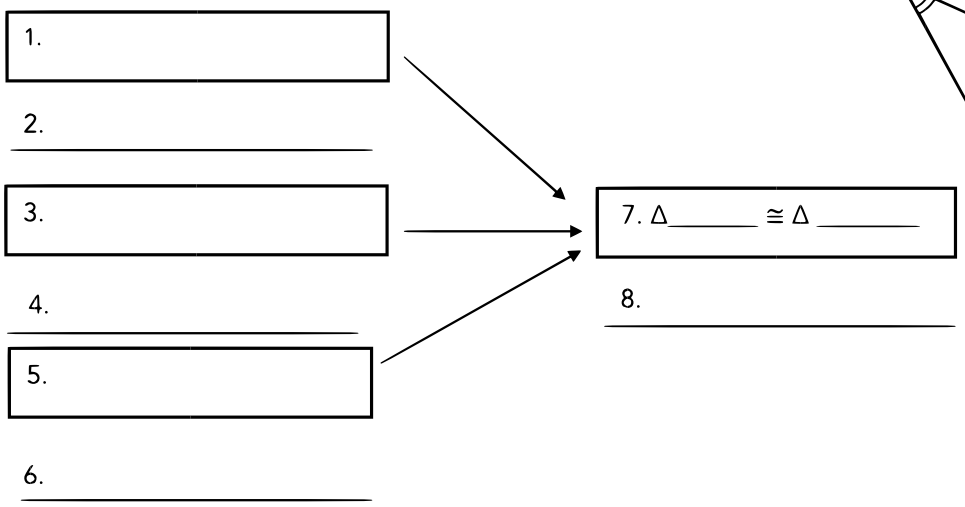
7. In the figure shown, $\overline{VZ} \parallel \overline{ST}$ and $\overline{ZY} \cong \overline{SY}$. Are the triangles congruent? If so, complete the congruence statement and state the congruence conjecture. If not, write "cannot be determined" and explain why.



   $\triangle VZY \cong \triangle$_____

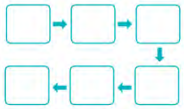
8. Fill in the missing statements and reasons to complete the flowchart proof and prove that $\triangle NOP \cong \triangle QPO$. If the information was given to you in the problem, write "Given" as the reason.





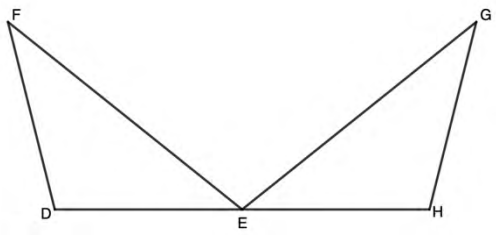
Name: _____ Hour: _____ Date: _____

How Does an Argument Flow?



In English class, you've learned how to write persuasive essays by gathering data to support your claim, outlining your response, and finally, writing out your argument. In math, we use a similar process to write proofs.

1. In the triangles shown below, you are told that $\angle D \cong \angle H$ and $\angle F \cong \angle G$. Mark this in the diagram.



2. You are also told that E is the midpoint of $\overline{DH}$.
   a. What does this mean?

   b. Mark this in the diagram.

3. Our goal is to prove that $\Delta FDE \cong \Delta GHE$. Do we have enough information to do this? Explain.

4. What triangle congruence conjecture might we use? Explain your choice.

5. We need three congruent parts to use our conjecture. Write down the three sets of congruent segments or angles in the boxes below.

6. Is $\overline{FD}$ congruent to $\overline{GH}$? How do you know?

Name: _____ Hour: _____ Date: _____

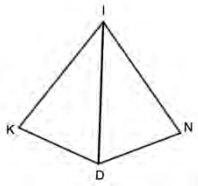
Lesson 4.10 – Triangle Congruence Proofs

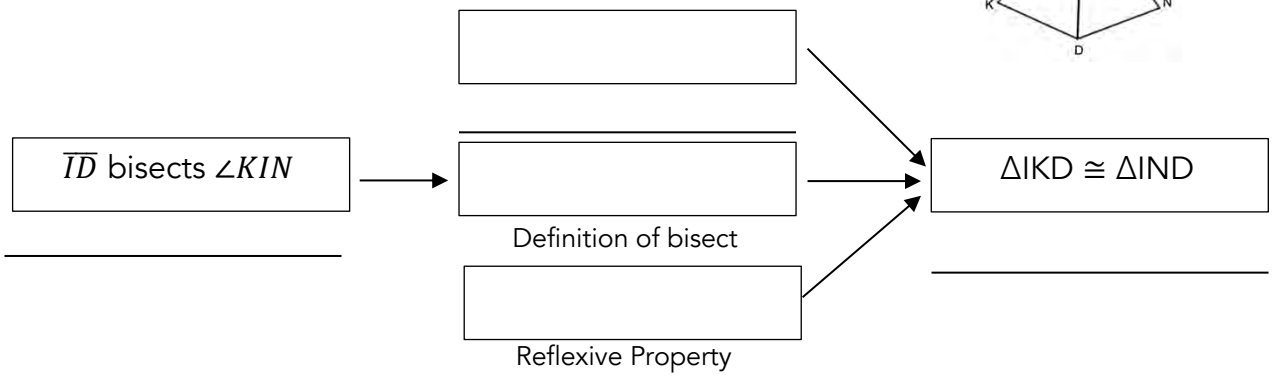
QuickNotes

Check Your Understanding

1. Complete the flowchart proof by filling in the missing statements and reasons.

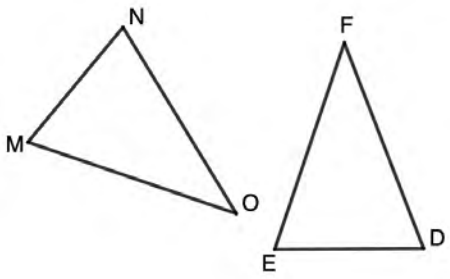
Given: $\overline{ID}$ bisects $\angle KIN$
$\overline{IK} \cong \overline{IN}$
Prove: ΔIKD ≅ ΔIND

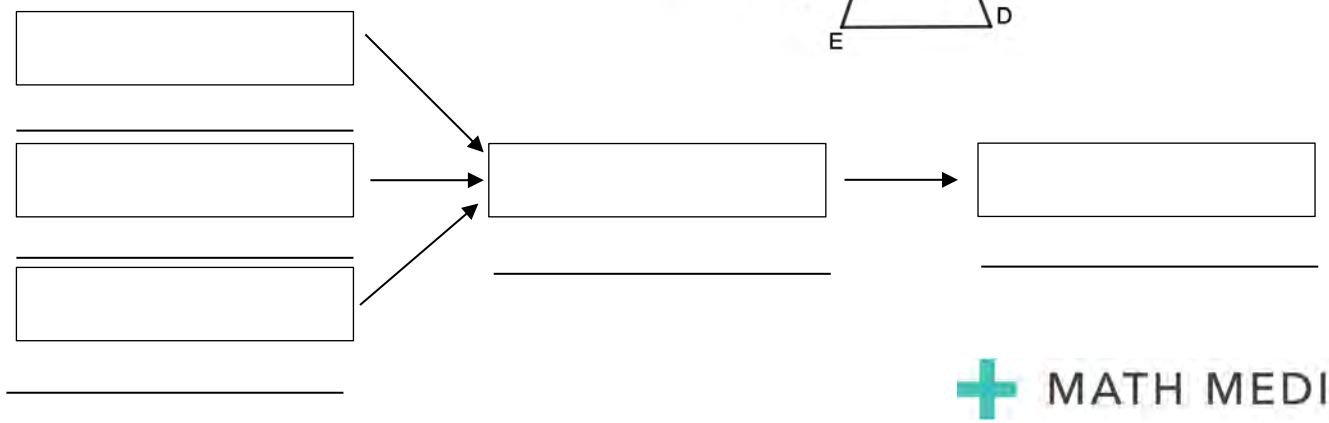




2. Complete the flowchart proof.

Given: $\overline{MN} \cong \overline{DE}$, $\overline{NO} \cong \overline{EF}$, $\overline{OM} \cong \overline{FD}$
Prove: $\angle M \cong \angle D$.





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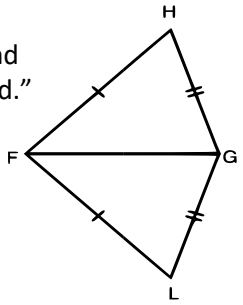
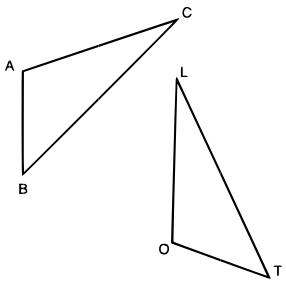
Geo Homework 4.10

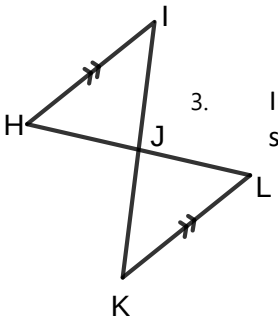
Name _____

1. Determine if the two triangles are congruent. If so, write a congruence statement and state the congruence conjecture that supports it. If not, write "cannot be determined."



2. Given that $\overline{CA} \cong \overline{LO}$ and $\angle C \cong \angle L$, state the third, missing congruence that is needed to show that $\triangle CAB \cong \triangle LOT$ using the specified congruence conjecture.
   a. SAS
   b. ASA

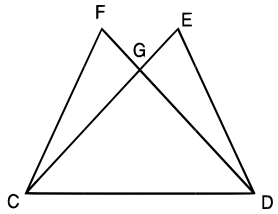




3. In the figure shown below, what reason could be used to support the statement $\angle H \cong \angle L$?

4. Sketch a diagram of $\triangle SAM \cong \triangle HQT$ so that $\overline{MS} \cong \overline{TH}$, $\angle M \cong \angle T$, and $\overline{SA} \cong \overline{HQ}$. Then determine whether they are congruent by one of the congruence conjectures.

5. Given: $\angle F \cong \angle E$, $\overline{FG} \cong \overline{GE}$. Answer the following questions to prove that $\triangle GCD$ is isosceles.

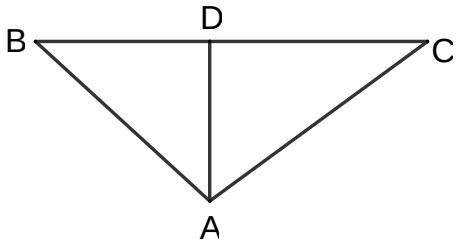


   a. What does it mean for a triangle to be isosceles? What would we have to show?

   b. Do you see any congruent triangles in the figure? How do you know they are congruent?

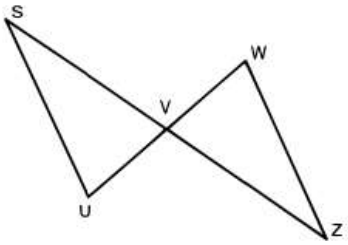
   c. How is proving congruent triangles related to proving that $\triangle GCD$ is isosceles?

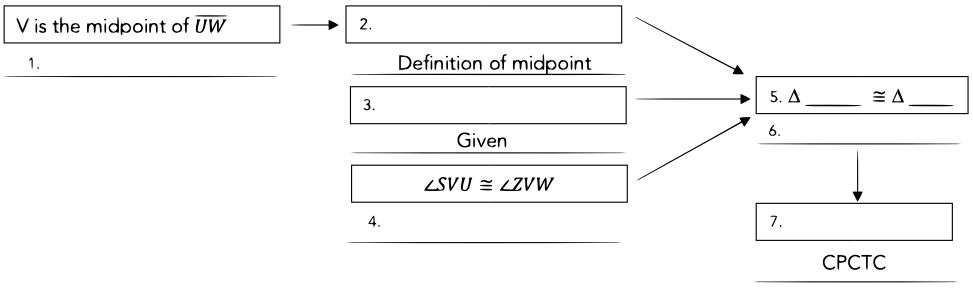
6. In the figure shown, $\overline{AD} \perp \overline{BC}$. Which of the following statements is guaranteed to be true?



A) $m\angle BDA = m\angle CDA$
B) $\triangle BDA \cong \triangle CDA$
C) $m\angle BAC = 90°$
D) $\overline{AD}$ is the angle bisector of $\angle BAC$

7. Fill in the missing statements and reasons for the proof below.
Given: V is the midpoint of $\overline{UW}$, $\angle S \cong \angle Z$
Prove: $\overline{SU} \cong \overline{ZW}$





8. Write a flowchart proof.

Given: $\overline{MN} \cong \overline{QN}$, $\overline{NU}$ is the angle bisector of $\angle MNQ$
Prove: $\triangle MNU \cong \triangle QNU$