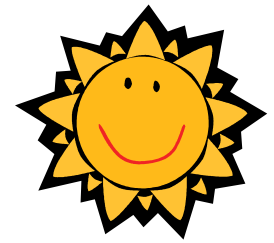


Unit 1 Day 9

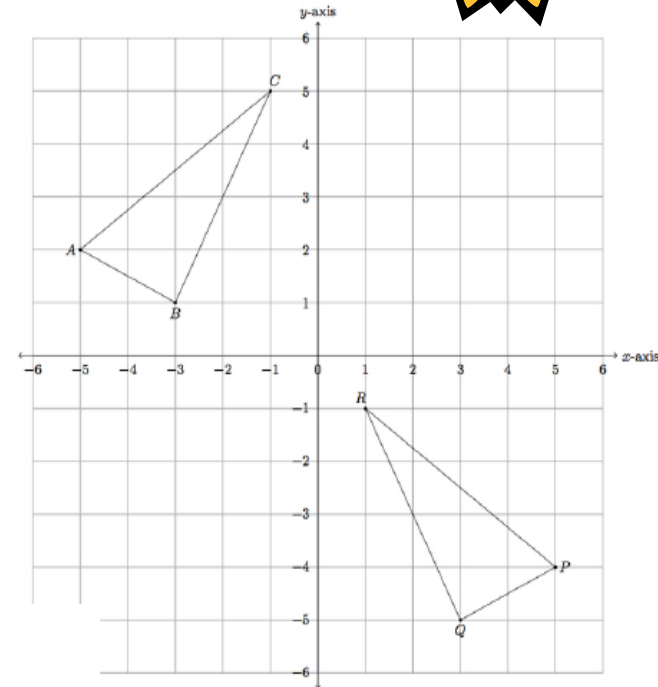
Triangle Congruence & CPCTC
Using Triangle Sum Theorem

Warm Up

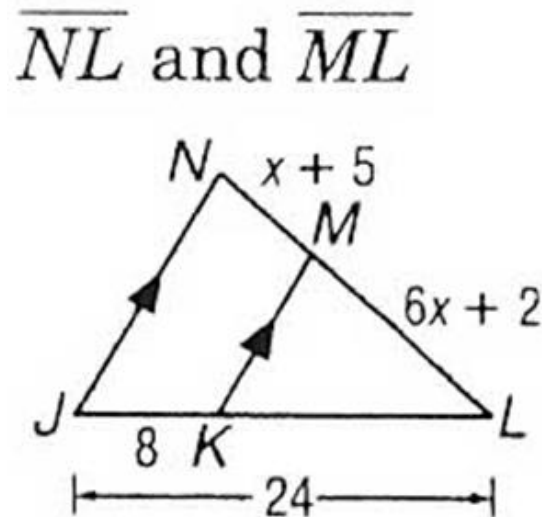


$\triangle ABC$ and $\triangle PQR$ are shown below in the coordinate plane:

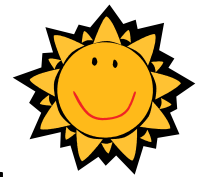
- Show that ABC is congruent to PQR with a reflection followed by a translation.
- If you reverse the order of your reflection and translation in part (a) does it still map ABC to PQR ?
- Find a second way, different from your work in part (a), to map ABC to PQR using translations, rotations, and/or reflections.



- Explain why the triangles are similar and write a similarity statement. Then, find the value of x and the lengths of the segments requested.



Warm Up Answers



Triangles ABC and PQR are shown below in the coordinate plane:

- a. Show that ABC is congruent to PQR with a reflection followed by a translation.

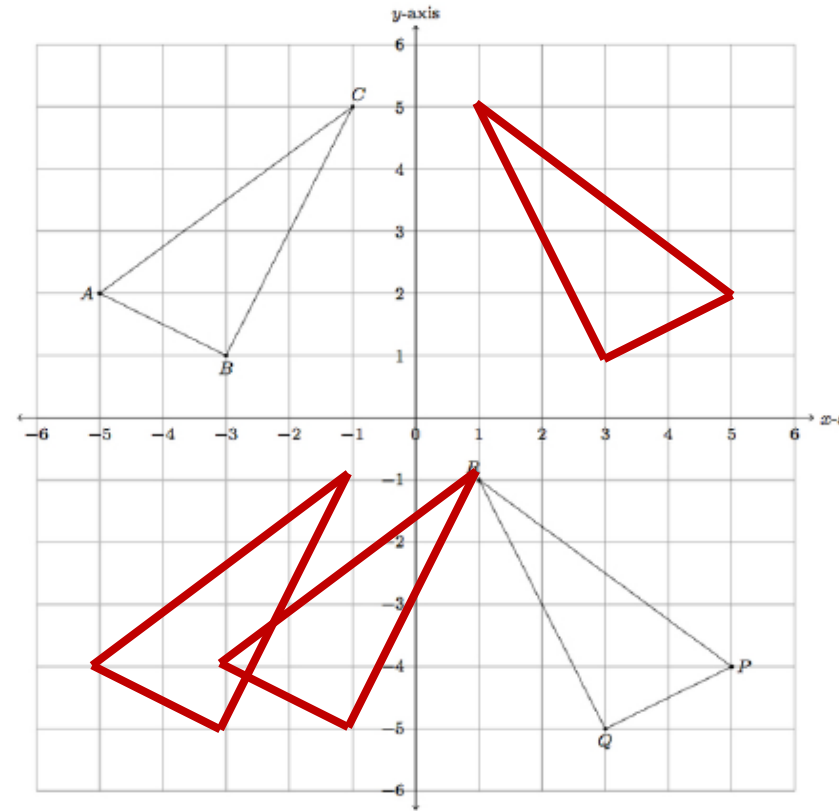
Reflection across y-axis, then translation down 6 units

- b. If you reverse the order of your reflection and translation in part (a) does it still map ABC to PQR?

Yes! Translation down 6 units then reflection across y-axis gives same final image.

- c. Find a second way, different from your work in part (a), to map ABC to PQR using translations, rotations, and/or reflections.

Answers will vary. Example: a translation down 6 & right 2, then reflection over $x = 1$ gives same final image.



Warm Up Answers

d) Explain why the triangles are similar, then write a similarity statement. Find the value of x and the lengths of the segments requested.

$\angle L \cong \angle L$ due to reflexive property, $\angle LMK \cong \angle LNJ$ and

$\angle LJN \cong \angle LKM$ because if lines are $//$, then corresponding angles are congruent. So $\triangle JLN \sim \triangle KLM$ by $AA\sim$.

BE CAREFUL!!!

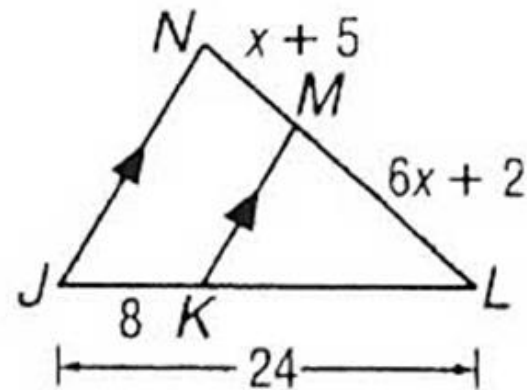
Do

$$\begin{array}{l} \text{Side} = \text{Side} \\ \text{Side} = \text{Side} \end{array} \quad \frac{6x + 2}{7x + 7} = \frac{16}{24}$$

NOT

$$\begin{array}{l} \text{Part} = \text{Side} \\ \text{Side} = \text{Side} \end{array} \quad \begin{array}{l} 24(6x + 2) = 16(7x + 7) \\ 144x + 48 = 112x + 112 \\ x = 2 \end{array}$$

\overline{NL} and \overline{ML}



Homework

- Packet p. 27-29 Evens
- Packet p. 30 All



Day 8 Homework

Part 1

1 a) Translation right 6, down 7

b) Yes. Explanations will vary. Sample: A translation is an isometry, so figures are congruent.

2 c) 180° rotation centered on the origin

3 b) Reflection over $y = x$

4 b) Yes. Explanations will vary. Sample: a reflection is an isometry, so figures are congruent

d) Yes. Explanations will vary. Sample: a translation is an isometry, so figures are congruent

e) Yes. Explanations will vary. Sample: a composition of an isometry is an isometry, so figures are congruent

Day 8 Homework

Part 1

5 a) 90° rotation centered on the origin

b) Yes. Explanations will vary. Sample: A rotation is an isometry, so figures are congruent.

6 b) Yes. Enlargement by scale factor of 2.

c) No. The figures have the same shape, but not the same “size so they are similar not congruent.

Day 8 Homework

Part 2

1) Yes by SAS \cong Postulate

3) Not congruent

5) Yes by ASA \cong Postulate

7) Yes by SSS \cong Postulate

9) Not Congruent

11) Yes by HL \cong Thm (or AAS \cong Thm)

13) Not congruent

15) Not congruent

17) Yes by SAS \cong Postulate

19) Yes by SSS \cong Postulate

21) $\overline{EC} \cong \overline{TV}$

23) $\overline{KL} \cong \overline{WL}$

25) $\overline{YF} \cong \overline{ED}$

27) $\overline{GI} \cong \overline{VX}$

29) $\angle BCD \cong \angle ICD$

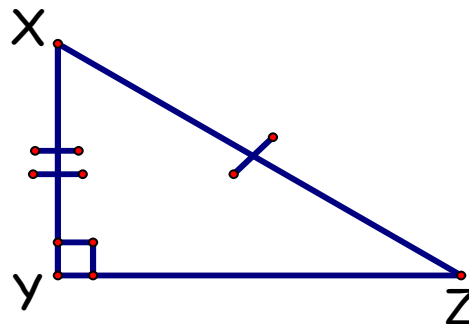
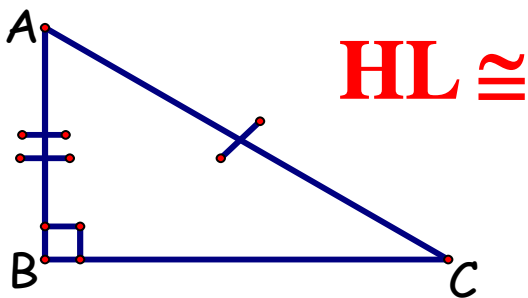
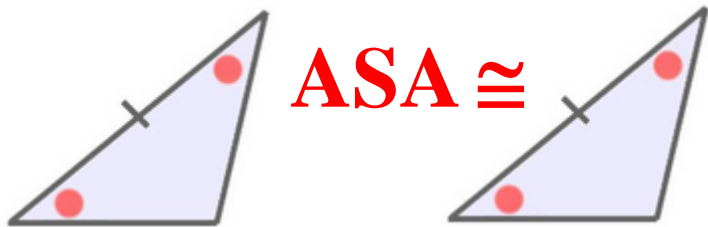
Notes Day 9

Using Corresponding Parts of
Congruent Triangles are Congruent

Finding missing parts of triangles
using Triangle Sum Theorem

Notes Day 9

Review: What are the 5 shortcuts to knowing that two triangles are congruent?



HM2 Unit 1: Are We Congruent? Activity #1

- <https://play.kahoot.it/#/?quizId=fbfda5c9-10dc-4412-b415-20f53482687f>





Practice:

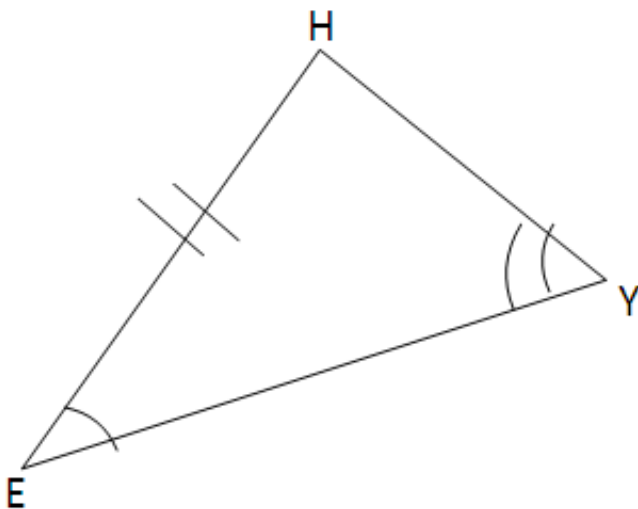
**Washington Puzzle
or
Congruent Triangles
Worksheet**

Once we use one of the shortcuts to show that triangles are congruent, we know that the other 3 parts have congruent matches.

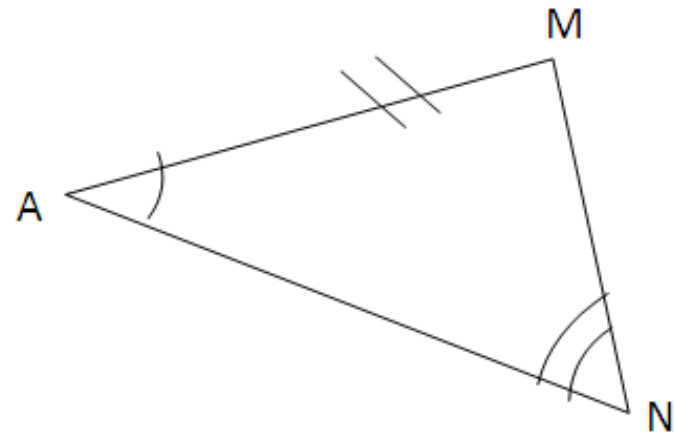
In Geometry, we state that “**c**orresponding **p**arts of **c**ongruent **t**riangles are **c**ongruent, or CPCTC.”

#1: $\triangle HEY$ is congruent to $\triangle MAN$ by AAS.

What **other** parts of the triangles are congruent **by CPCTC**?



$$\begin{array}{c} \overline{HY} \cong \overline{MN} \\ \overline{EY} \cong \overline{AN} \\ \angle H \cong \angle M \end{array}$$



You Try!

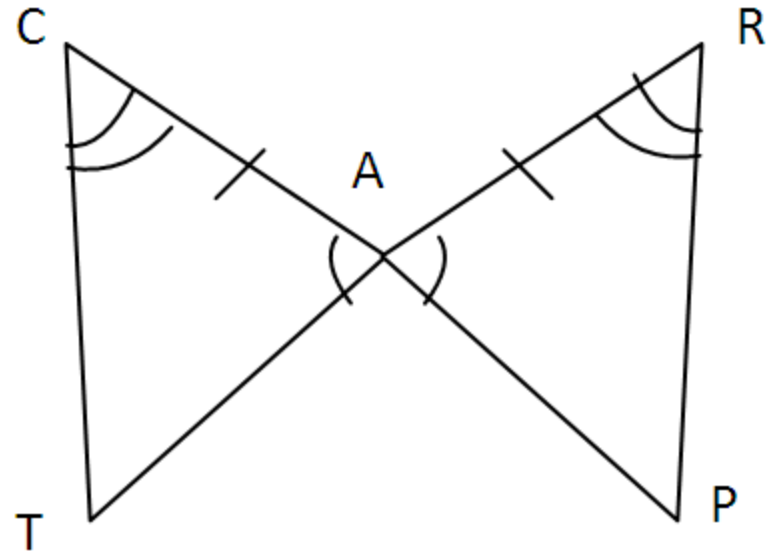
#2: $\triangle CAT \cong \underline{\triangle RAP}$,
by ASA

THEREFORE:

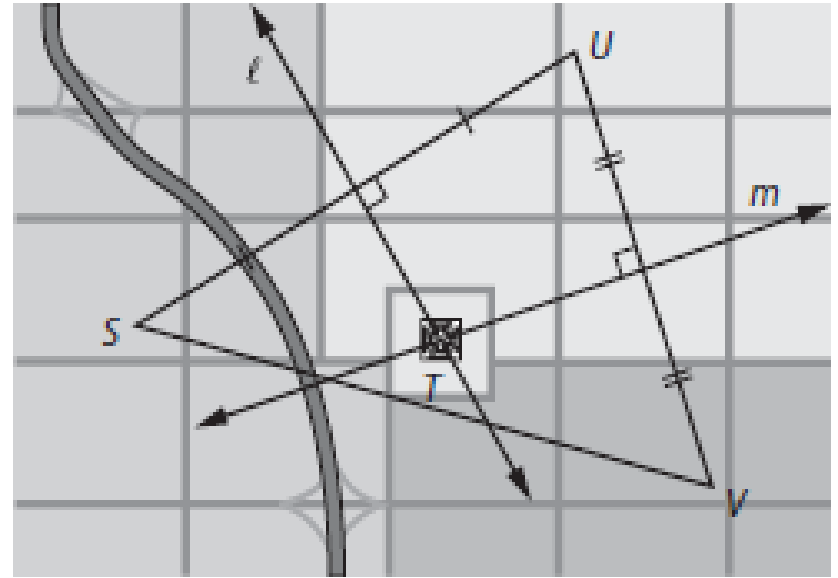
\overline{CT} \cong \overline{RP} , by CPCTC

\overline{TA} \cong \overline{PA} , by CPCTC

$\angle T$ \cong $\angle P$, by CPCTC



Example: Plans for the location of a telecommunications tower that is to serve three northern suburbs of Milwaukee are shown below. Design specifications indicate the tower should be located so that it is equidistant from the center S , U , and V of each of the suburbs. In the diagram, line l is the *perpendicular bisector* of SU . Line m is the perpendicular bisector of UV .

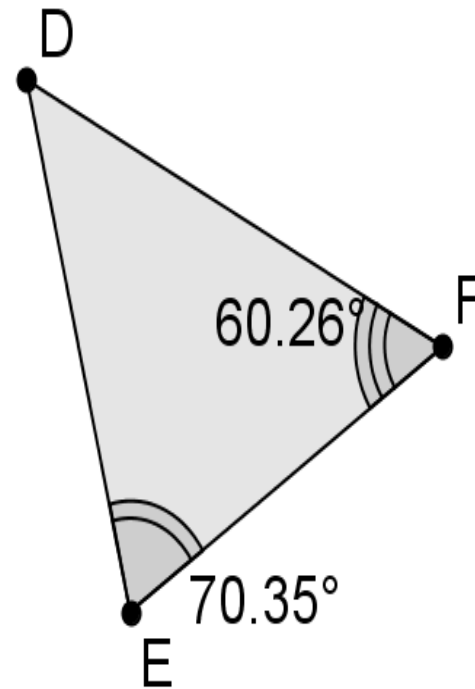
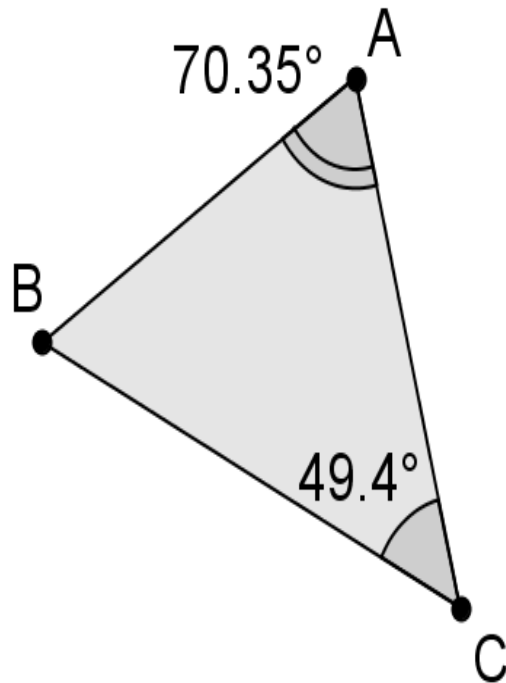


Draw line TS and line TU . How can you show that $TS = TU$.

Draw *line* TV on your diagram. Prove that $TU = TV$.

Explain why the tower should be located at point T .

Are the following triangles congruent? Explain.



No! Having 3 sets of congruent corresponding angles does **NOT** prove **triangle congruence**.

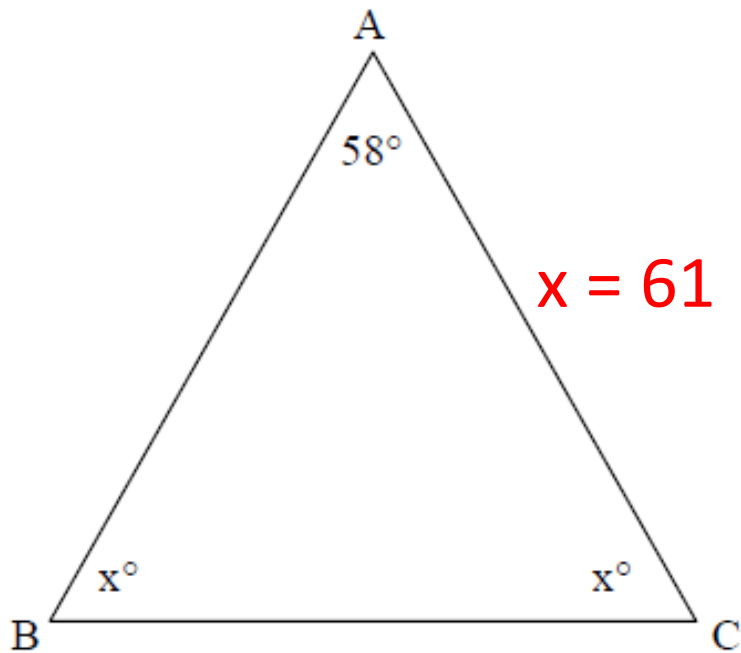
In the previous example, we needed to use the idea that the three angles of a triangle add to 180°.

-> this is called **Triangle Sum Theorem** 😊

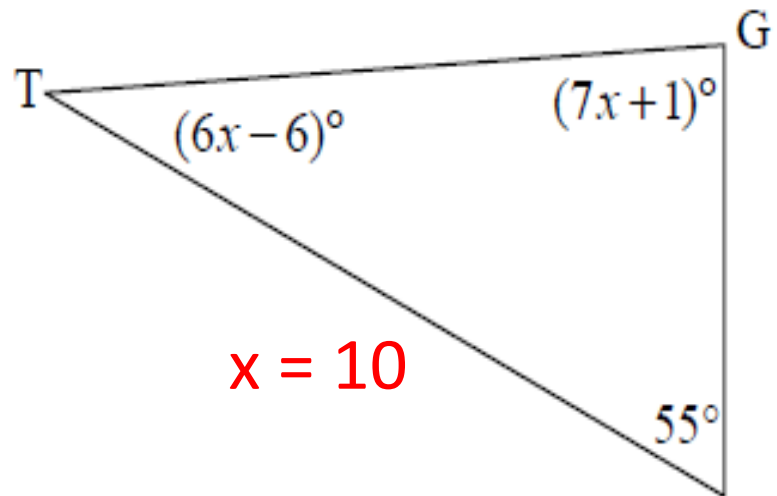
Let's play with this theorem for a bit...

Solve for the missing variables:

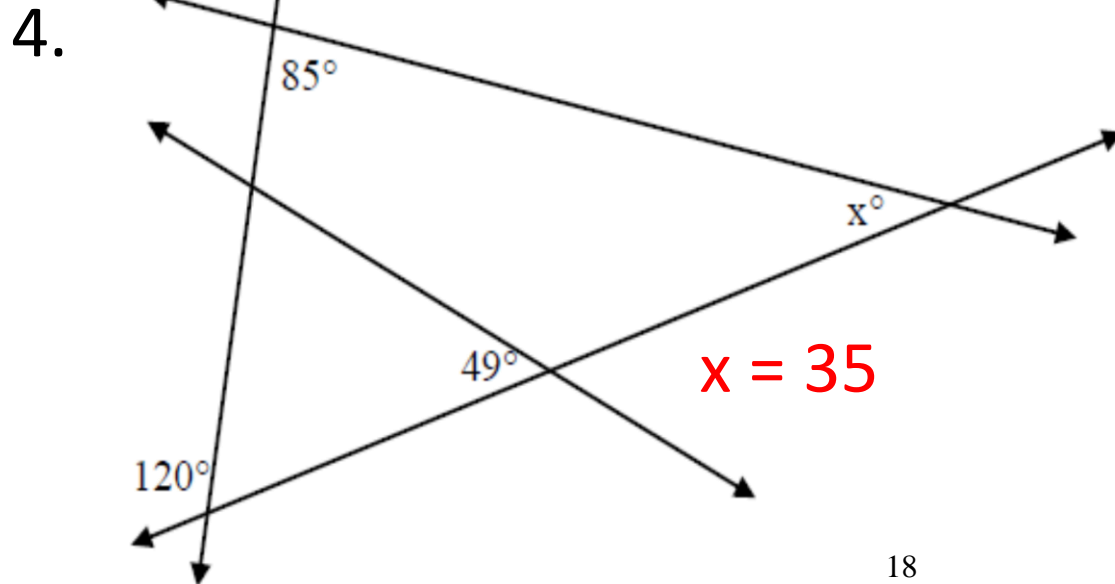
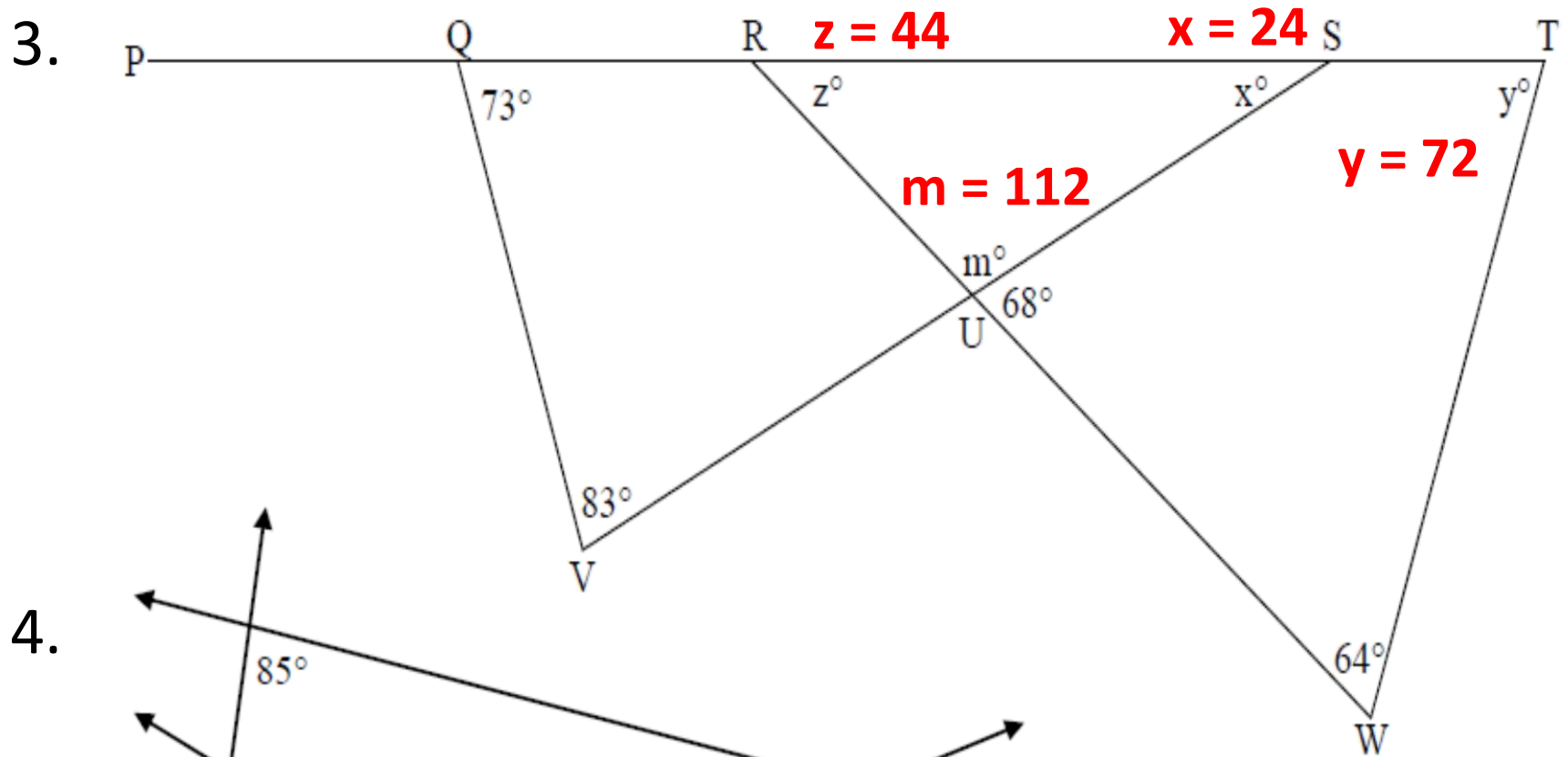
1.



2.



Solve for the missing variables:



HM 2 Unit 1: Day 9 Triangles, Angles, and Congruence

- <https://play.kahoot.it/#/?quizId=d98fc57f-5f7d-4e86-89a2-2d4a3800be2c>





Exit Ticket

**- on a NEW sheet of paper
(no 1/2 sheets!!)**

Draw a pair of congruent triangles and place markings on the triangles in such a way that would allow you to establish that the triangles...

- 1) were congruent by SSS Postulate.**
- 2) were congruent by SAS Postulate.**
- 3) were congruent by ASA Postulate.**
- 4) were congruent by AAS Theorem.**

- 5) Draw a pair of congruent triangles and place markings on the triangles in such a way that would NOT allow you to establish that the triangles were congruent.**

Homework

- Packet p. 27-29 Evens
- Packet p. 30 All

