Geometry Unit 4 worksheet: SSS, SAS, ASA, AAS

Name _____ Date _____ Period _____

1. In $\triangle RST$ and $\triangle UVW$, $\overline{RS} \cong \overline{UV}$ and $\overline{ST} \cong \overline{VW}$. You may add one more pair of corresponding parts.

(a) Which pair of angles would let SAS prove the triangles congruent?

(b) Which pair of sides would let SSS prove it?

(c) Explain why no single added pair could complete ASA or AAS, and why adding $\angle R \cong \angle U$ or $\angle T \cong \angle W$ would not prove the triangles congruent.

2. In $\triangle ABC$, $AB = x + y$, $BC = 2x - y$ and $CA = 10$. In $\triangle DEF$, $DE = 11$, $EF = 7$ and $FD = 10$. No pairing of the vertices is given.

(a) Find every pair of values of x and y for which SSS proves the two triangles congruent.

(b) For each pair, write the congruence statement that begins $\triangle ABC \cong$, with the vertices in matching order.

3. Each list gives three pairs of congruent parts of $\triangle PQR$ and $\triangle XYZ$. The pairs are not always in letter order. For each list, write a congruence statement that begins $\triangle PQR \cong$ with the vertices in matching order and name the criterion, or say that no criterion applies and why.

(a) $\overline{PQ} \cong \overline{ZX}$, $\angle Q \cong \angle X$, $\overline{QR} \cong \overline{XY}$

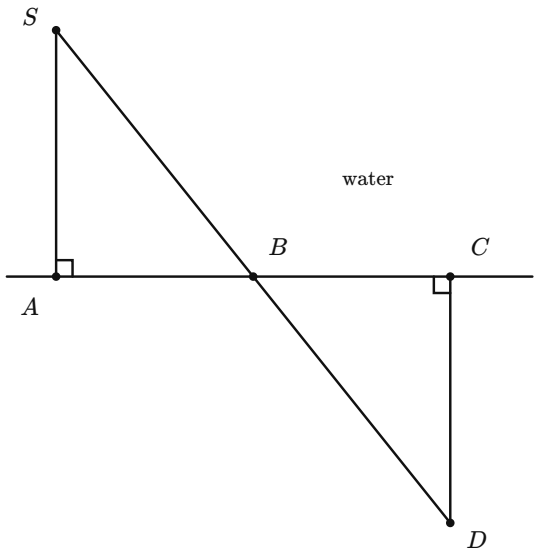
(b) $\angle R \cong \angle Y$, $\overline{RP} \cong \overline{YX}$, $\angle P \cong \angle X$

(c) $\angle P \cong \angle Z$, $\angle Q \cong \angle Y$, $\overline{QR} \cong \overline{YX}$

(d) $\angle P \cong \angle Z$, $\angle Q \cong \angle Y$, $\overline{PR} \cong \overline{YX}$

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4. Ngozi stands at A on a straight shore and sights a ship S, so that $\overline{AS}$ is perpendicular to the shore. She walks along the shore to a point B and plants a post, then walks on the same distance to C, so that $BC = AB$. At C she turns away from the water and walks perpendicular to the shore until she reaches the point D where the post at B lies exactly in line with the ship. She measures $CD = 230$ m.



(a) Name two congruent triangles, the criterion that proves it, and the three pairs of parts it uses.

(b) How far is the ship from A?

5. (a) Liam says: "If two triangles have two pairs of congruent sides and the same perimeter, then they are congruent." Is he right? Explain, naming a criterion.

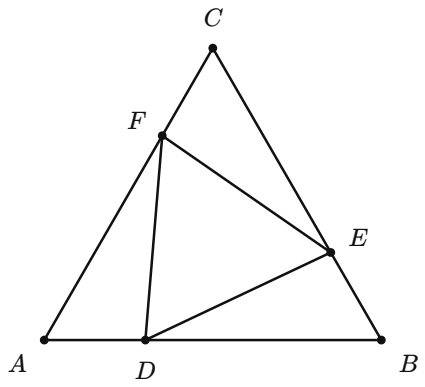
(b) Liam then says that one pair of congruent sides and the same perimeter is enough. Show that he is wrong by giving the side lengths of two triangles that are not congruent, each with a side of 5 and a perimeter of 18.

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6. **Given.** In $\triangle ABC$, $\overline{AB} \cong \overline{AC}$ and $\angle A \cong \angle B$. Points D, E and F lie on the sides $\overline{AB}$, $\overline{BC}$ and $\overline{CA}$, each between the two vertices, with $\overline{AD} \cong \overline{BE}$ and $\overline{AD} \cong \overline{CF}$. Segments $\overline{DE}$, $\overline{EF}$ and $\overline{FD}$ are drawn.

Prove. $\triangle ADF \cong \triangle BED$.

Write a two-column proof.



Statements	Reasons

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