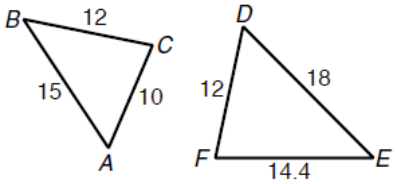
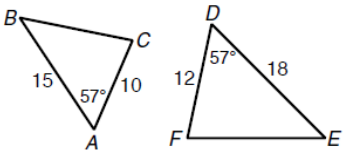
Geometry H Name: _____

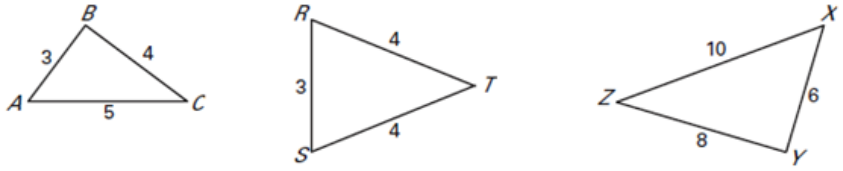
6.5 – SSS ~ and SAS~

- I can SSS~, and SAS~ to show that triangles are similar.
- I can use SSS~ and SAS~ to find side lengths and angle measures.

Theorem Name	What it says…	Example with explanation
Side-Side-Side Similarity SSS~	If the three sides of one triangle are proportional to the three sides of another triangle, then the triangles are similar. (Check to see if the ratios of the three corresponding sides are the same, if they are, the reduced fraction is your scale factor and the triangles are similar!)	 $\frac{short}{short}, \frac{medium}{medium}, \frac{long}{long} \Rightarrow$ ____, ____, ____ *the three fractions reduce to* ____ $\Delta ABC : \Delta DEF$ *by SSS : with scale factor* ____
Side-Angle-Side Similarity SAS~	If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar. (Check to see if the ratios of two pairs of corresponding sides reduce to the same fraction and that the angles that joins the two sides are congruent)	 $\frac{short}{short}, \frac{long}{long} \Rightarrow$ ____, ____ *both fractions reduce to* ____ *and their included angles are both* 57° $\Delta ABC : \Delta DEF$ *by SAS : with scale factor* ____

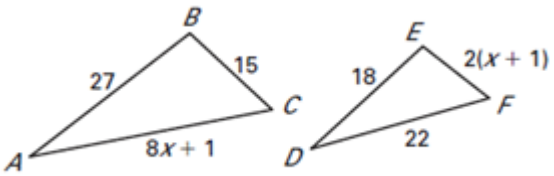
✓ **I can use the SSS~ to identify similar triangles.**

1) Is either ΔRST or ΔXYZ similar to ΔABC ?



✓ **I can use SSS~ to solve problems.**

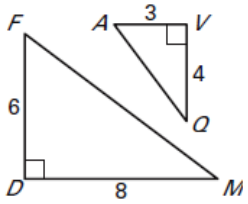
2) Find the value of x that makes $\Delta ABC \sim \Delta DEF$



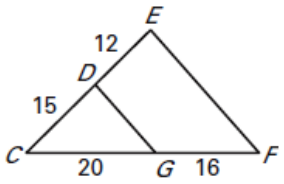
✓ **I can use SAS~ to identify similar triangles.**

3) Are the triangles similar? If so, write a similarity statement and state the similarity postulate or theorem that justifies your answer.

a)



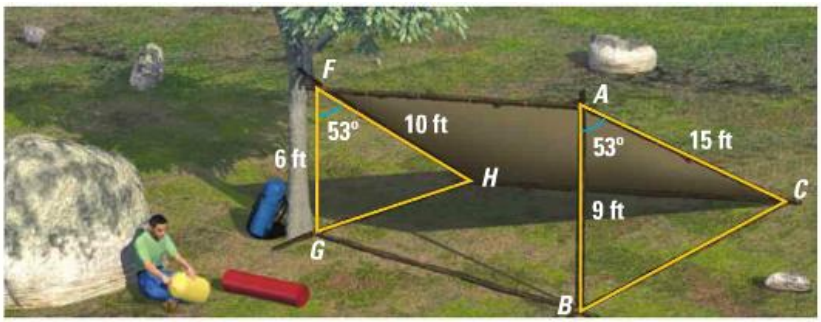
b)



✓ **I can use SAS~ to solve problems.**

4) Find the value of m that makes $\Delta ABC \sim \Delta DEF$ when $AB = 3$, $BC = 4$, $DE = 2m$, and $EF = m + 5$, $\angle B \cong \angle E$.

5) You are building a lean-to shelter starting from a tree branch, as shown. Can you construct the right end so it is similar to the left end using the angle measures and lengths shown?

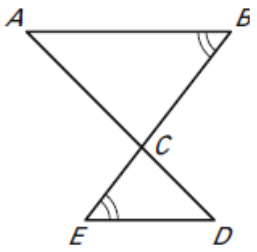


Geometry H
Homework: 6.5 – SSS~ and SAS~

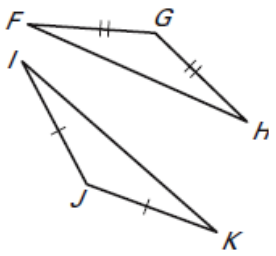
Name: _____
Date: _____ Period: _____

Are the triangles similar? If so, state the similarity and the postulate or theorem that justifies your answer.

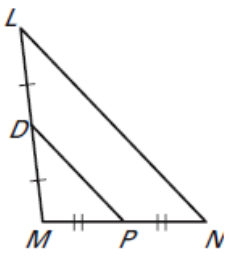
1.



2.

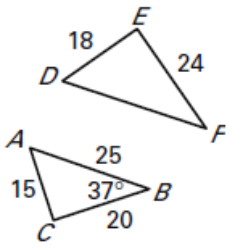


3.

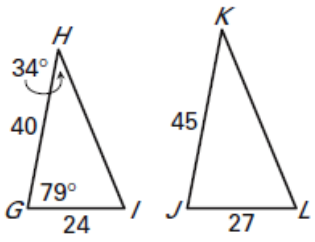


The figure does not have enough information to verify that the triangles are similar. Describe a postulate or theorem and one additional marking that could be added to the figure to show similarity.

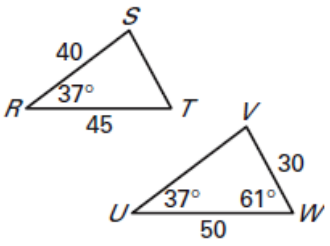
4.



5.



6.



Sketch the triangles using the given description. *Explain* whether the triangles can be proven similar.

7. In $\triangle ABC$, $m\angle A = 38°$ and $m\angle B = 94°$. In $\triangle XYZ$, $m\angle Y = 94°$ and $m\angle Z = 48°$.

8. The ratio of AB to XY is $2:3$. In $\triangle ABC$, $m\angle B = 75°$, and in $\triangle XYZ$, $m\angle Y = 75°$. The ratio of BC to YZ is $2:3$.

9. In $\triangle ABC$, $m\angle B = 50°$, $AB = 4$, and $BC = 9$. In $\triangle XYZ$, $m\angle Y = 50°$, $XY = 2$, and $YZ = 4.5$.

Use the diagram to complete the statement.

10. $m\angle DGE =$?

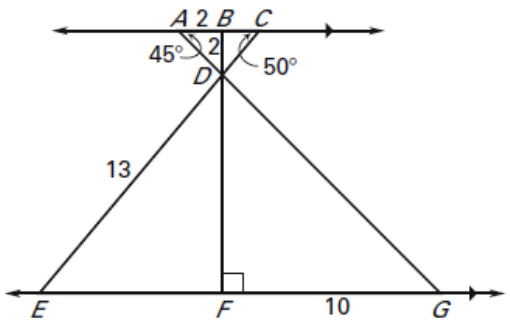
11. $m\angle EDG =$?

12. $FD =$?

13. $GD =$?

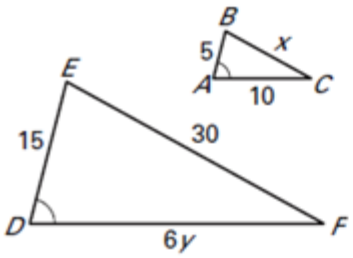
14. $EG =$?

15. Name three pairs of triangles that are similar in the figure.

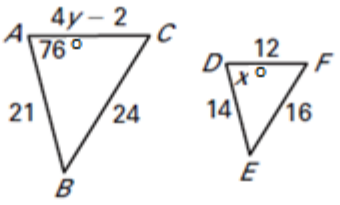


Find the values of the variables that make $\triangle ABC \sim \triangle DEF$.

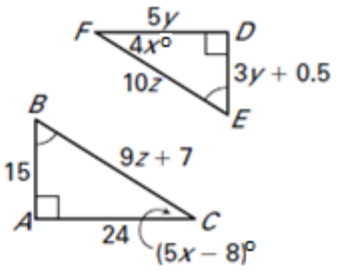
16.



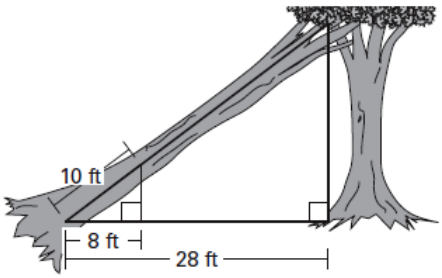
17.



18.



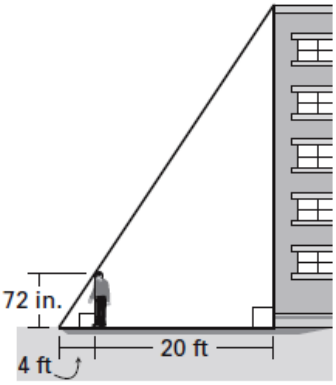
19. A large tree has fallen against another tree and rests at an angle as shown in the figure. To estimate the length of the tree that has fallen, you make the measurements shown in the figure.



a) What theorem or postulate could be used to show that the triangles in the figure are similar?

b) How could we use similar triangles to estimate the length of the tree? What is the approximate length of the tree that has fallen?

20. A painter is preparing an estimate to paint a building. To approximate the building's height, he stands so that the tip of his shadow coincides with that of the building. The painter uses the measurements shown in the figure.



a) What postulate or theorem can you use to show that the triangles are similar?

b) Approximate the height of the building.

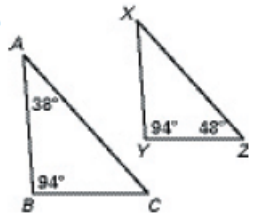
c) The painter's partner is standing in the sun. She is 62 inches tall. How long is her shadow?

ANSWER KEY

1. yes; AA **2.** no **3.** yes; SAS **4.** Mark DF as 30 to use SSS. **5.** Mark $m\angle J$ as $79°$ to use SAS.

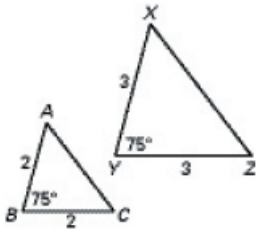
6. Mark UV as $44\frac{4}{9}$ to use SAS.

7.



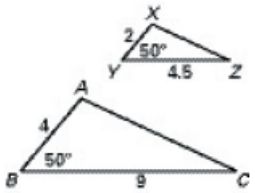
AA Similarity Post.

8.



SAS Similarity Thm.

9.



SAS Similarity Thm.

10. $45°$ **11.** $85°$ **12.** 10 **13.** $10\sqrt{2}$ **14.** $10 + \sqrt{69}$

15. $\triangle ABD \sim \triangle GFD, \triangle CBD \sim \triangle EFD, \triangle ACD \sim \triangle GED$ **16.** $x = 10, y = 5$ **17.** $x = 76, y = 5$

18. $x = 8, y = 4, z = 2\frac{1}{3}$

19. a) AA~ **b)** Sample answer: Use the similar triangles to set up the proportion $\frac{x}{10} = \frac{28}{8}$. The length of the tree is 35 ft.

20. a) AA~ **b)** 36 ft **c)** $41\frac{1}{3}$ in.