

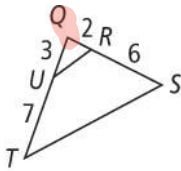
UNIT 5  
ASSIGNMENT #11

Similar Triangles

OBJECTIVE: S.W.B.A.T set up ratios between two triangles in order to find missing variables.

Determine whether the triangles are similar. If so, write a similarity statement and name the postulate or theorem you used. If not, explain.

1.

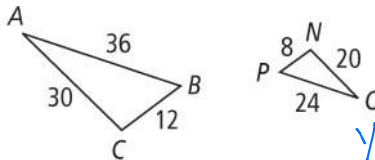


$$\frac{3}{2} = \frac{10}{6}$$

$$\frac{3}{2} \neq \frac{5}{3}$$

Not similar,  
Scale factor  
not the same

2.

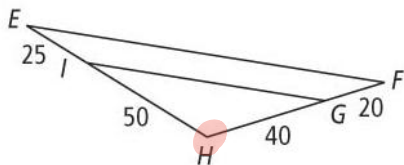


$$\frac{8}{12} = \frac{24}{36} = \frac{20}{30}$$

$$\frac{2}{3} = \frac{2}{3} = \frac{2}{3}$$

Yes, SSS similarity

3.

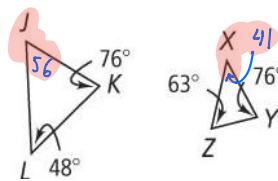


$$\frac{50}{40} = \frac{50+25}{40+20}$$

Yes, SAS similarity

$$\frac{50}{40} = \frac{75}{60} \xrightarrow{\text{reduce}} \frac{5}{4} = \frac{5}{4} \checkmark$$

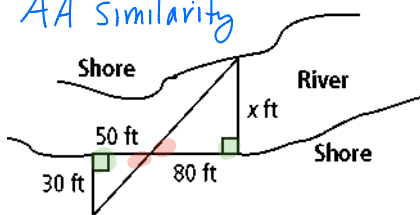
4.



Not enough info

Explain why the triangles are similar. Then find the distance represented by x.

5. AA similarity

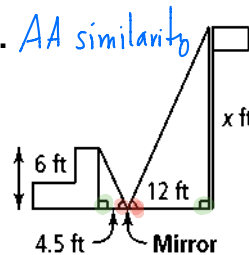


$$\frac{50}{30} = \frac{80}{x}$$

$$\frac{50x}{50} = \frac{30(80)}{50}$$

$$x = 48 \text{ feet}$$

6. AA similarity

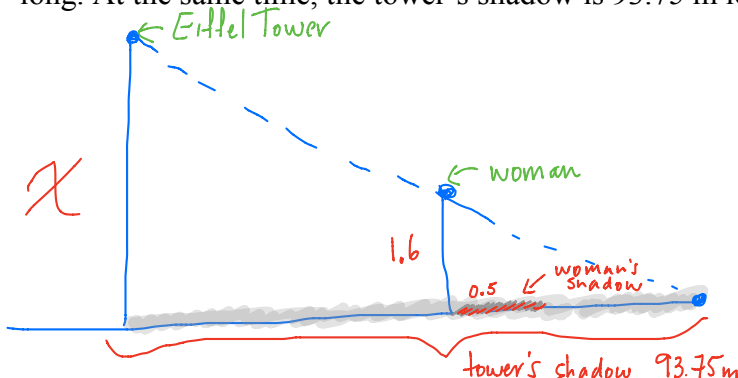


$$\frac{6}{4.5} = \frac{x}{12}$$

$$\frac{6(12)}{4.5} = \frac{4.5x}{4.5}$$

$$16 \text{ feet} = x$$

7. A 1.6-m-tall woman stands next to the Eiffel Tower. At this time of day, her shadow is 0.5 m long. At the same time, the tower's shadow is 93.75 m long. How tall is the Eiffel Tower?

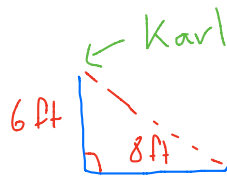


$$\frac{x}{93.75} = \frac{1.6}{0.5}$$

$$\frac{0.5x}{0.5} = \frac{(93.75)(1.6)}{0.5}$$

$$x = 300 \text{ meters}$$

8. At 4:00 P.M. Karl stands next to his house and measures his shadow and the house's shadow. Karl's shadow is 8 ft long. The house's shadow is 48 ft long. If Karl is 6 ft tall, how tall is his house?

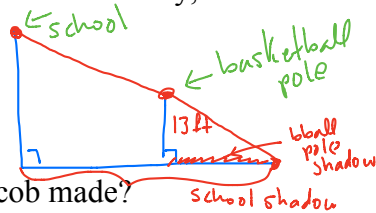


$$\frac{x}{48} = \frac{6}{8}$$

$$\frac{8x}{8} = \frac{6(48)}{8}$$

$$x = 36 \text{ feet}$$

9. **Error Analysis** Jacob wants to use indirect measurement to find the height of his school. He knows the basketball pole next to the school is 13 ft high. He measures the length of the pole's shadow. At the same time of day, he measures the length of the school's shadow. Then he writes a proportion:



$$\frac{13 \text{ ft}}{\text{school height}} = \frac{\text{school shadow}}{\text{pole shadow}}$$

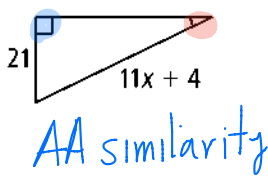
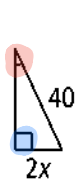
What error has Jacob made?

10. **Reasoning** Explain why there is an AA Similarity Postulate but not an AA Congruence Postulate.

**Algebra** Explain why the triangles are similar. Then find the value of  $x$ .

11.

$$\begin{array}{r} 420 \\ 6 \overline{) 420} \\ \underline{6} \phantom{0} \\ 6 \phantom{0} \\ \underline{6} \phantom{0} \\ 0 \end{array}$$



AA similarity

$$\frac{2x}{40} = \frac{21}{11x+4}$$

$$2x(11x+4) = 40(21)$$

$$22x^2 + 8x = 840$$

$$22x^2 + 8x - 840 = 0$$

$$2(11x^2 + 4x - 420) = 0$$

$$2(11x + 70)(x - 6) = 0$$

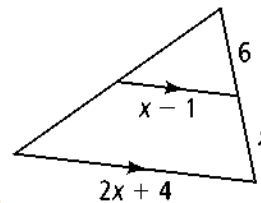
$$2(11x + 70) = 0 \quad x - 6 = 0$$

$$11x + 70 = 0 \quad x = 0$$

$$11x = -70$$

$$x = -\frac{70}{11}$$

12.



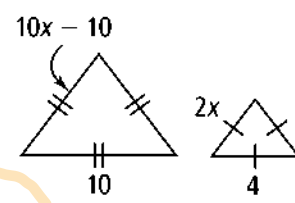
$$\frac{x-1}{6} = \frac{2x+4}{6+x}$$

$$(x-1)(x+3) = 6(2x+4)$$

$$x^2 + 3x - x - 3 = 12x + 24$$

$$x^2 - 7x - 30 = 0$$

13.



$$\frac{10x-10}{10} = \frac{2x}{4}$$

$$4(10x-10) = 10(2x)$$

$$40x - 40 = 20x$$

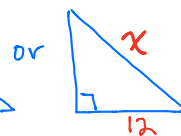
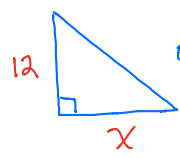
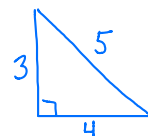
$$-40 = -20x$$

$$2 = x$$

16. **Think About a Plan** A right triangle has legs 3 cm and 4 cm and a hypotenuse 5 cm. Another right triangle has a 12-cm leg. Find all the possible lengths of the second leg that would make the triangles similar. For each possible length, find the corresponding length of the hypotenuse.

- To which measures must you compare the 12-cm leg?

You can compare 12 to either 3 or 4. These will result in two different side lengths because they are related to two different angles.



- How can you find the measure of the hypotenuse?

Set up a proportion using 12 with either 3 or 4 and  $x$  with 5.

$$\frac{3}{5} = \frac{12}{x} \quad \text{or} \quad \frac{4}{5} = \frac{12}{x}$$

$$x = 20 \quad \text{or} \quad x = 15$$