Geometry

Ch. 7 Handout 7.3

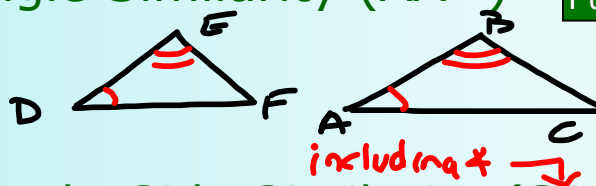
Proving Triangles Similar

Two polygons are similar if

1. Corresponding sides are in proportion Pull
2. Corresponding angles are congruent Pull
3. Pull

Ways to prove triangles are similar:

1 Angle-Angle Similarity (AA~)

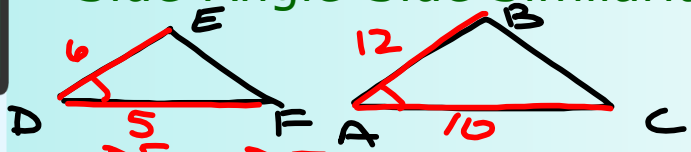


Pull

$\Delta DEF \sim \Delta ABC$

AA~

2 Side-Angle-Side Similarity (SAS~)



Pull

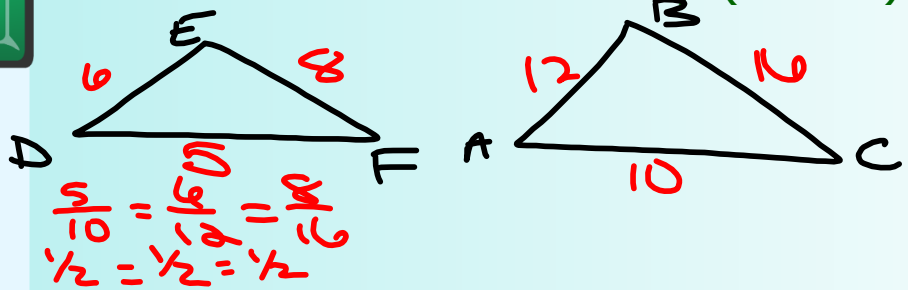
$\Delta DEF \sim \Delta ABC$

SAS~

including ∠

$\frac{DF}{AC} = \frac{DE}{AB}$

3 Side-Side-Side Similarity (SSS~)



Pull

$\Delta DEF \sim \Delta ABC$

SSS~

$\frac{5}{10} = \frac{6}{12} = \frac{8}{16}$

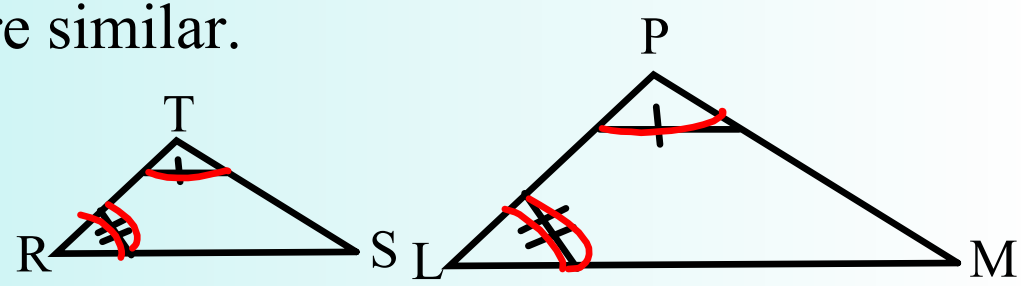
$\frac{1}{2} = \frac{1}{2} = \frac{1}{2}$

Postulate 7-1: Angle-Angle Similarity (AA~) Postulate

If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

$\Delta TRS \sim \Delta$ PLM

AA ~

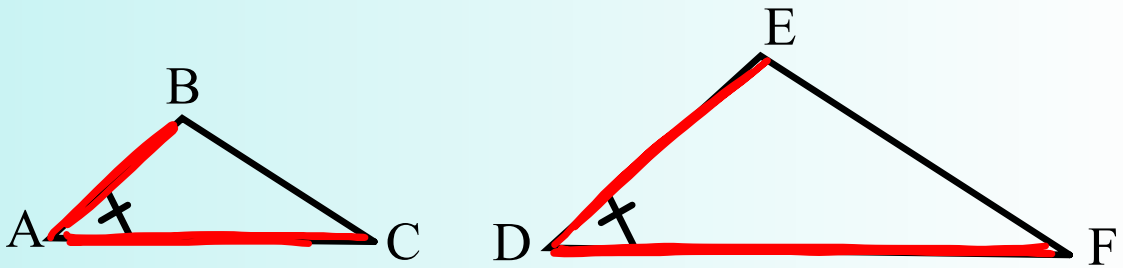


Theorem 7.1: Side-Angle-Side Similarity (SAS ~) Theorem

If an angle of one triangle is congruent to angle of a second triangle, and the sides including the two angles are proportional, then the triangles are similar.

$\Delta ABC \sim \Delta$ DEF

SAS ~



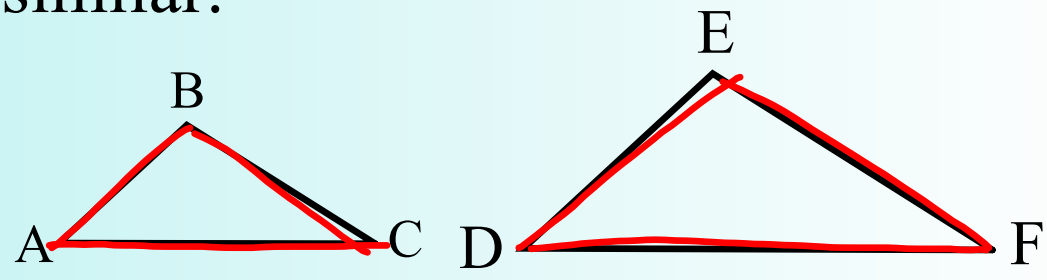
$\angle A \cong \angle D$, $\frac{AB}{DE} = \frac{AC}{DF}$

Theorem 7.2: Side-Side-Side Similarity (SSS ~)

If the corresponding sides of two triangles are proportional, then the triangles are similar.

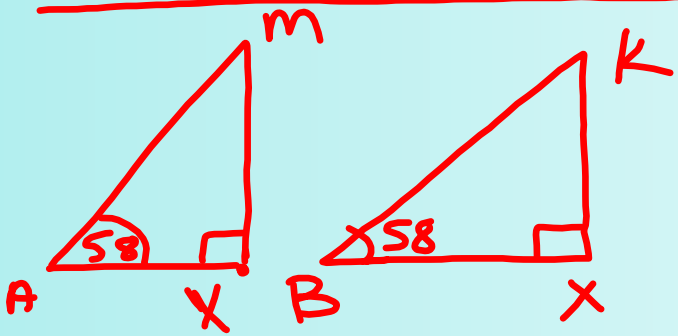
$\Delta ABC \sim \Delta$ DEF

SSS ~

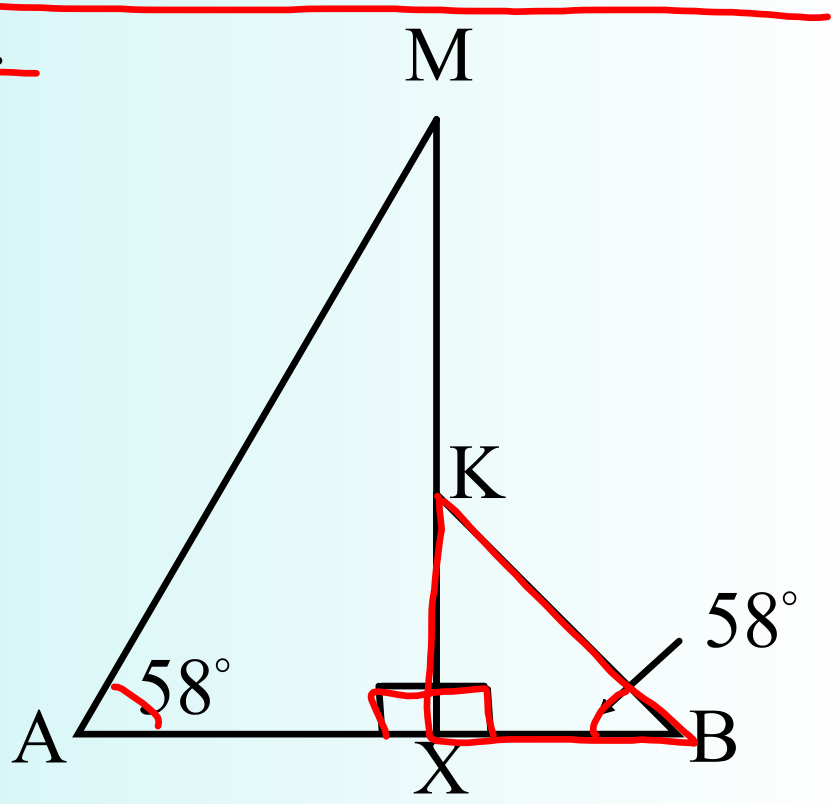


$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

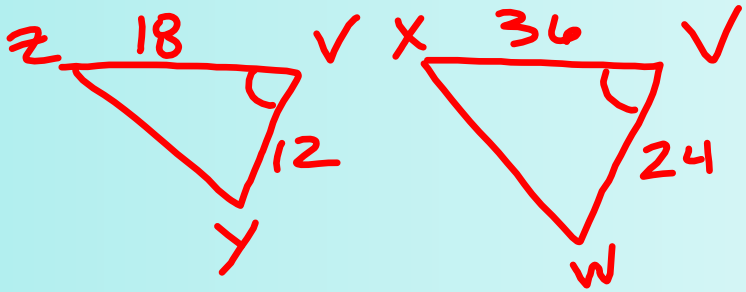
1. Given: $\overline{MX} \perp \overline{AB}$. Explain why the triangles are similar. Write a similarity statement.



AA~
$\triangle AXM \sim \triangle BXK$



2. Explain why the triangles must be similar. Write a similarity statement.

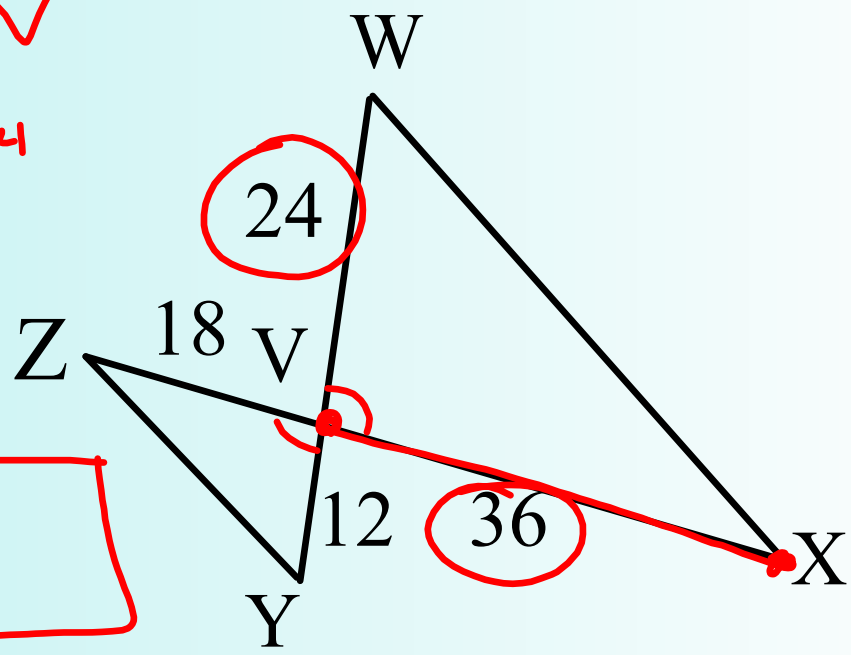


$\frac{18}{36} = \frac{12}{24}$

$\frac{1}{2} = \frac{1}{2}$

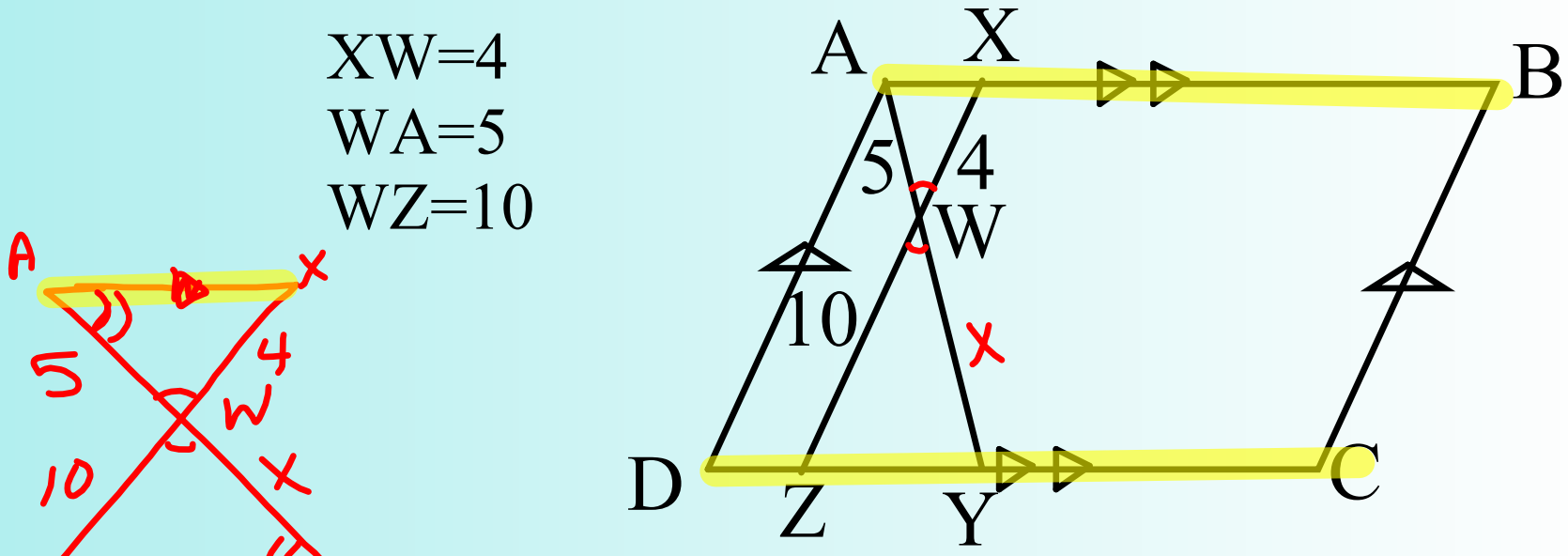
SAS ~

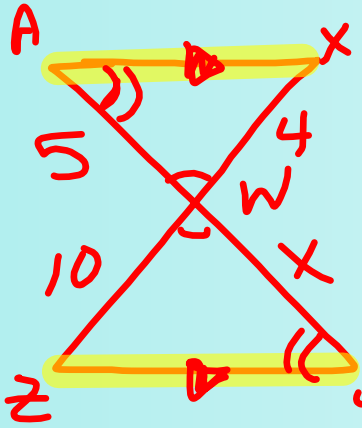
$\Delta ZVY \sim \Delta XVW$

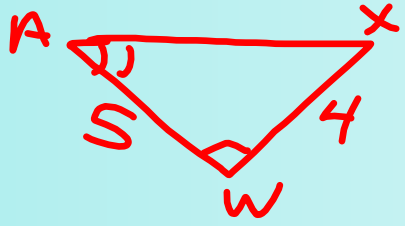


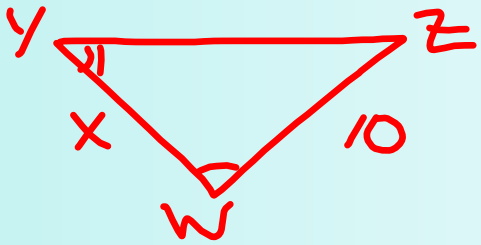
3. ABCD is a parallelogram. Find WY.

XW=4
WA=5
WZ=10







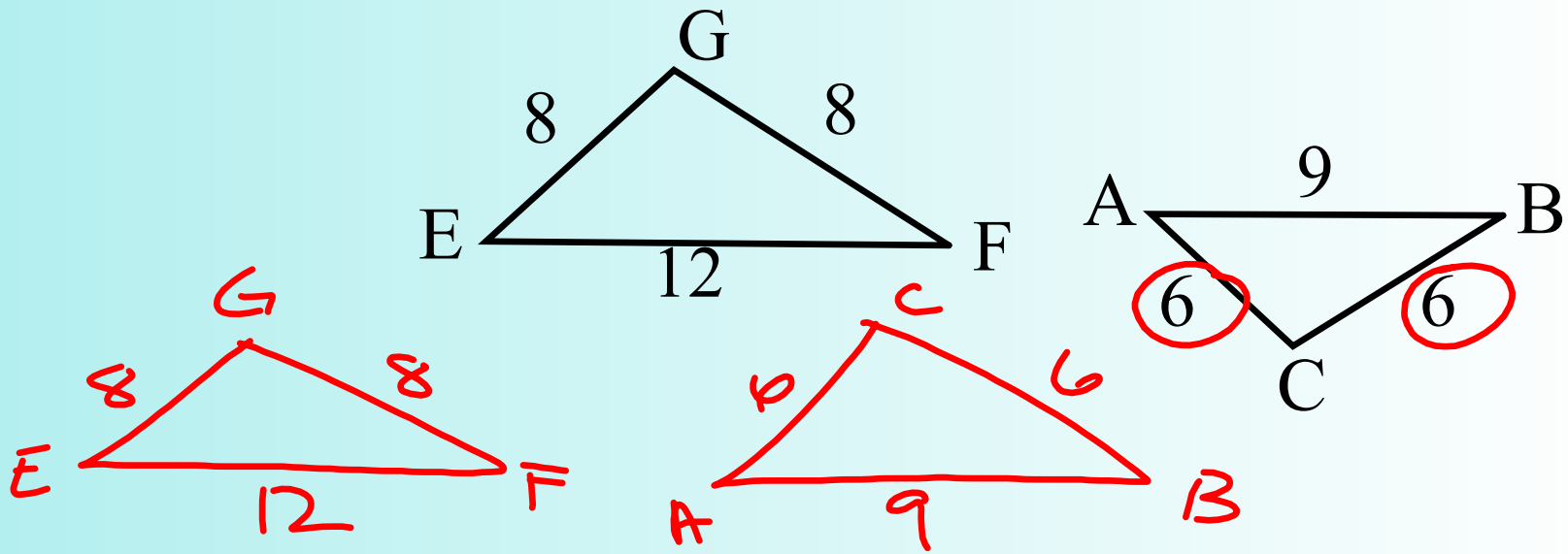


$\frac{5}{x} = \frac{4}{10}$

$\frac{4x}{4} = \frac{50}{4}$

$x = \frac{25}{2} = 12.5$

4. Explain why the triangles must be similar. Write a similarity statement.



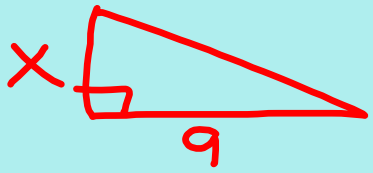
$\frac{12}{9} = \frac{8}{6} = \frac{8}{6}$

$\frac{4}{3} = \frac{4}{3} = \frac{4}{3}$

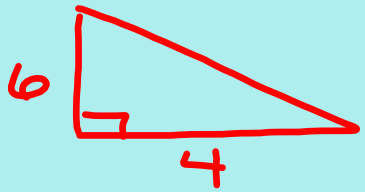
SSS~

$\Delta GEF \sim \Delta CAB$

5. In sunlight, a cactus casts a 9-ft shadow. At the same time, a person 6 ft tall casts a 4-ft shadow. Use similar triangles to find the height of the cactus.



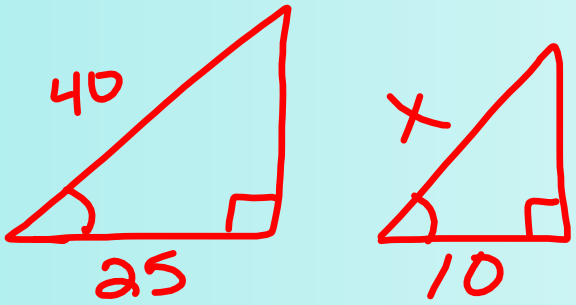
$$\frac{x}{6} = \frac{9}{4}$$



$$\frac{4x}{4} = \frac{54}{4}$$

$$x = \frac{27}{2} = 13.5 \text{ ft}$$

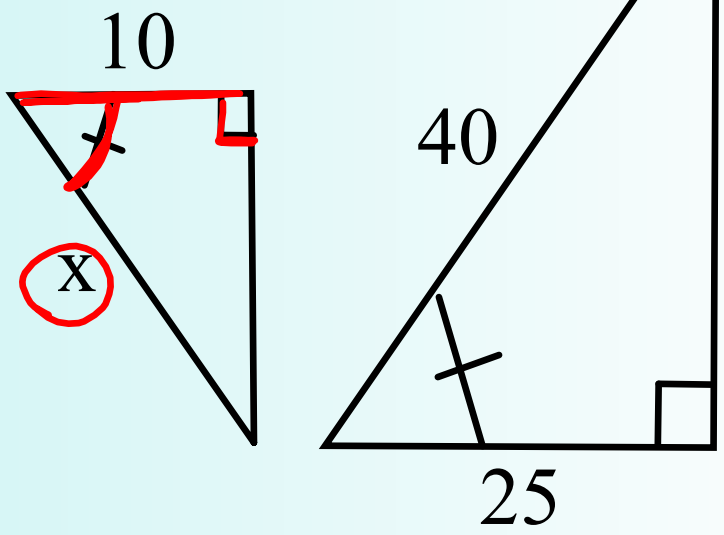
6. Find the value of x.



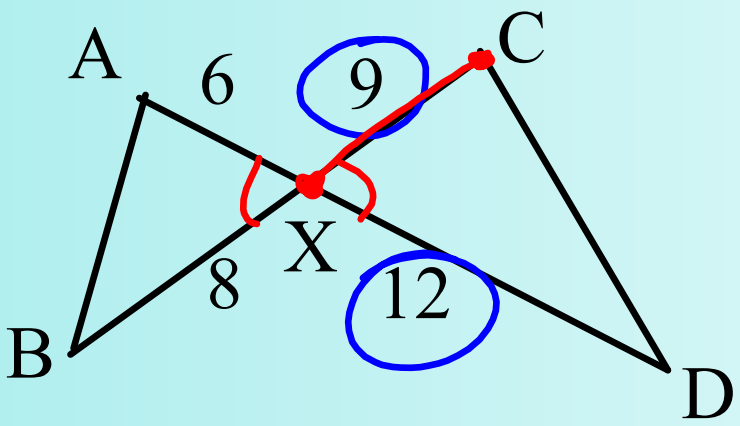
$\frac{40}{x} = \frac{25}{10}$

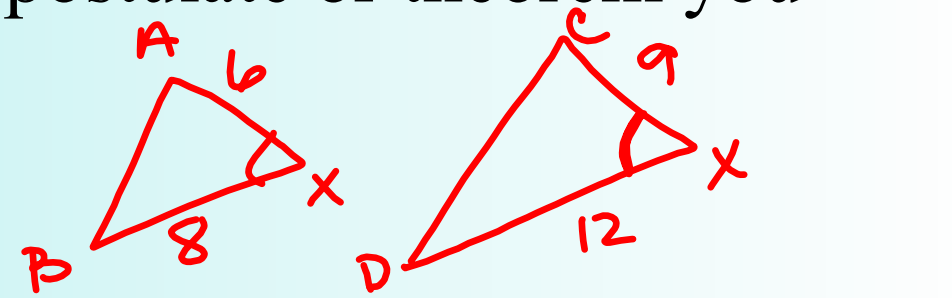
$25x = 400$

$x = 16$



7. Are the triangles similar? If so, write a similarity statement and name the postulate or theorem you used. If not, explain.





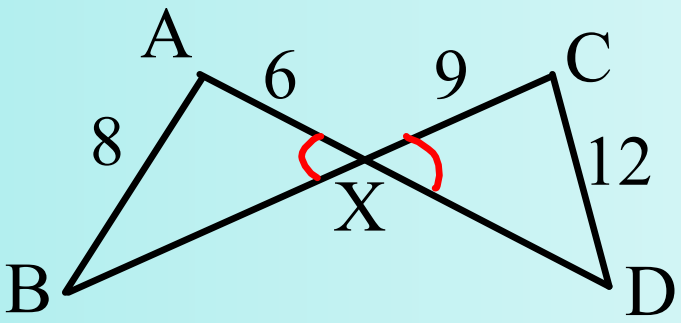
$\frac{6}{9} = \frac{8}{12}$

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

$\triangle ABX \sim \triangle CDX$

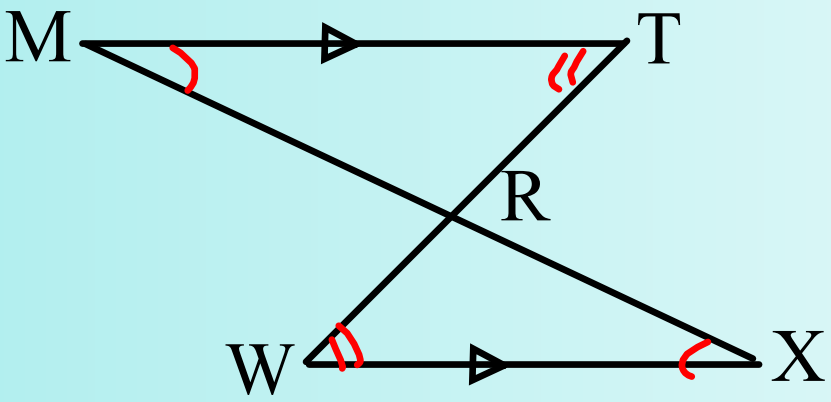
SAS~

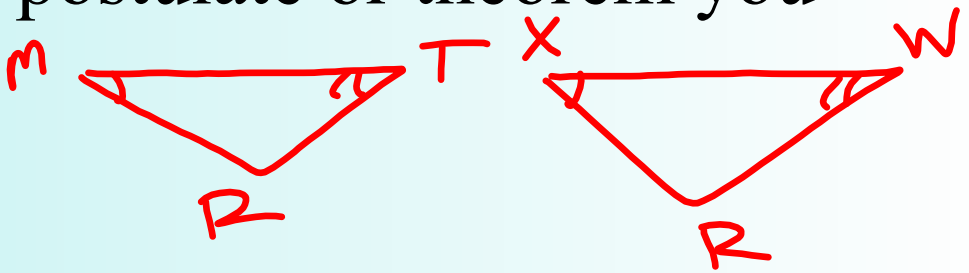
7. Are the triangles similar? If so, write a similarity statement and name the postulate or theorem you used. If not, explain.



Not ~

7. Are the triangles similar? If so, write a similarity statement and name the postulate or theorem you used. If not, explain.

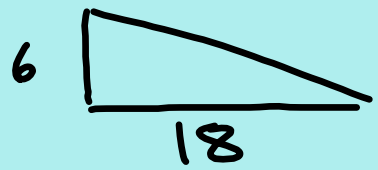


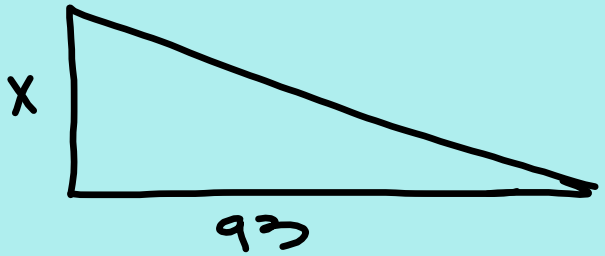


$\triangle RTM \sim \triangle RWX$

AA~

8. When a 6 ft tall man casts a shadow 18 ft long, a nearby tree casts a shadow 93 ft long. How tall is the tree?



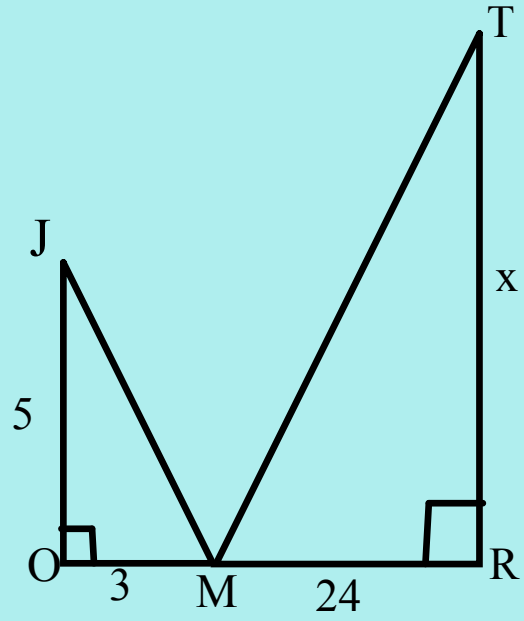


$\frac{6}{x} = \frac{18}{93}$

$18x = 558$

$x = 31$ ft

9. Joan places a mirror 24 ft. from the base of a tree. When she stands 3 ft from the mirror, she can see the top of the tree reflected in it. If her eyes are 5 ft above the ground, how tall is the tree?



Assignment:

7.3 pgs 385-388 1-9,22-27 (skip 23)

→ DUE in class ON Monday!