Warm Up

1. You are making pancakes and the recipe calls for 2 cups of mix and 1.5 cups of water. If you want to use 3 cups of mix, how much water do you need?

2. Solve for x. $\frac{x+4}{x-53} = \frac{31}{12}$

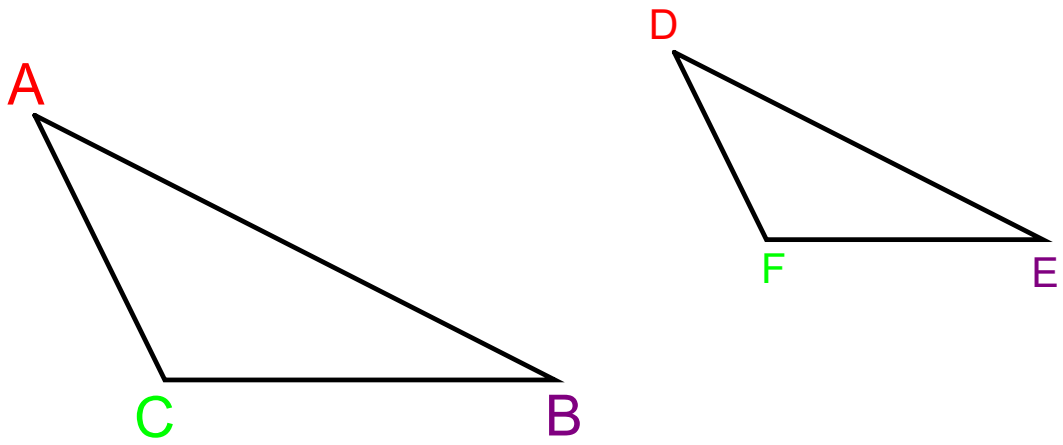
3. If a map has a scale of 3.5 cm : 16 mi, how far would 193 mi measure on the map? Set up a proportion and solve.

Learning Goal: Today I will learn how to prove triangles similar and how to use indirect measurement.

Success Criteria: I am able to use the similarity theorems to prove triangles similar.
I am able to set up similar triangles to perform indirect measurement.

7.3 Proving Triangles Similar and Indirect Measurement

Congruent vs Similar



Congruent vs Similar

Congruent triangles are exactly the same.

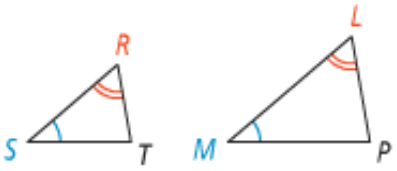
Similar triangles are **in proportion.**

take note

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

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

If . . .
$\angle S \cong \angle M$ and $\angle R \cong \angle L$

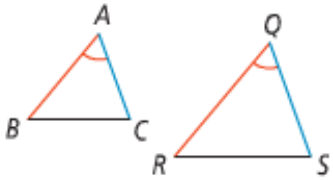


Then . . .
$\triangle SRT \sim \triangle MLP$

*Theorem 7-1 Side-Angle-Side Similarity (SAS ~) Theorem

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

If . . .
$\frac{AB}{QR} = \frac{AC}{QS}$ and $\angle A \cong \angle Q$



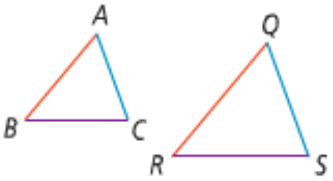
Then . . .
$\triangle ABC \sim \triangle QRS$

You will prove Theorem 7-1 in Exercise 35.

*Theorem 7-2 Side-Side-Side Similarity (SSS ~) Theorem

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

If . . .
$\frac{AB}{QR} = \frac{AC}{QS} = \frac{BC}{RS}$

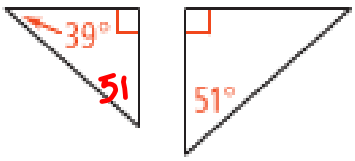


Then . . .
$\triangle ABC \sim \triangle QRS$

You will prove Theorem 7-2 in Exercise 36.

1. Are the two triangles similar? How do you know?

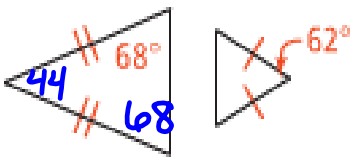
a.



yes AA

90+39=129
180-129=51

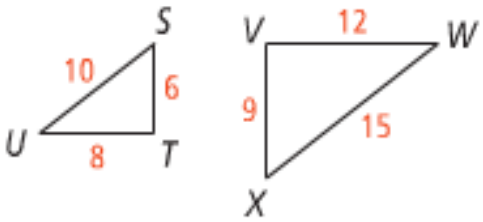
b.



no

Are the triangles similar? If so, write a similarity statement for the triangles.

A



To prove similarity using sides, you **must show the ratio of ALL sides** is the same

Shortest sides:

$\frac{6}{9} = \frac{2}{3} = .67$

Longest sides:

$\frac{10}{15} = \frac{2}{3}$

Remaining sides:

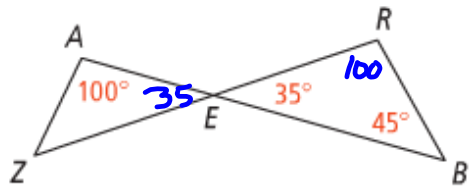
$\frac{8}{12} = \frac{2}{3}$

yes, SSS, $\triangle STU \sim \triangle XVW$

Are the triangles similar? If yes, write a similarity statement and explain how you know they are similar.

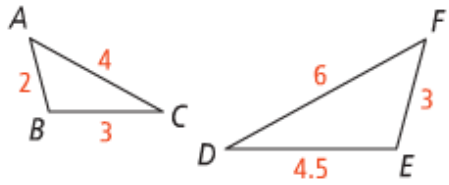
You try!

1.



yes, $\Delta AEZ \sim \Delta REB$, AA

2.

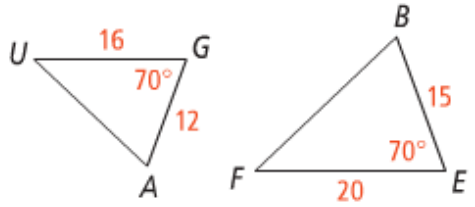


$\frac{2}{3}$

$\frac{4}{6} = \frac{2}{3}$

yes, $\Delta ABC \sim \Delta FED$ SSS

3.



$\frac{3}{4.5} = .667$

*Indirect Measurement

A method of measuring things that are **difficult** to measure **directly.**

What examples can you think of?

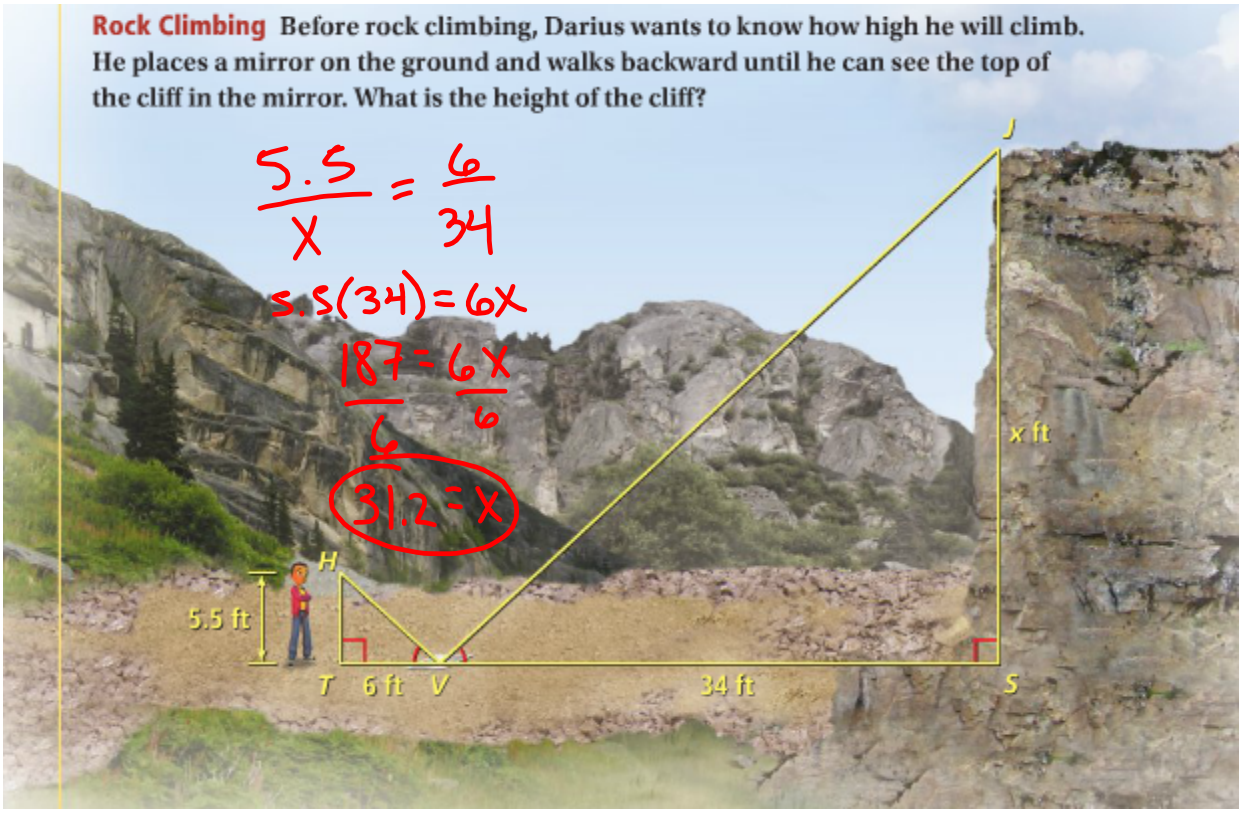
Rock Climbing Before rock climbing, Darius wants to know how high he will climb. He places a mirror on the ground and walks backward until he can see the top of the cliff in the mirror. What is the height of the cliff?

$\frac{5.5}{x} = \frac{6}{34}$

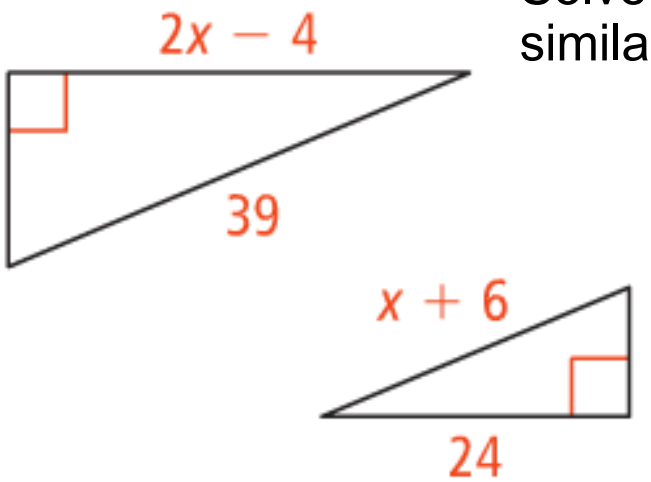
$5.5(34) = 6x$

$\frac{187}{6} = \frac{6x}{6}$

$31.2 = x$



Solve for x if the 2 triangles are similar .



Closure: Today I learned about triangle similarity and indirect measurement.