

## Lesson 3.4 Using Similar Triangles

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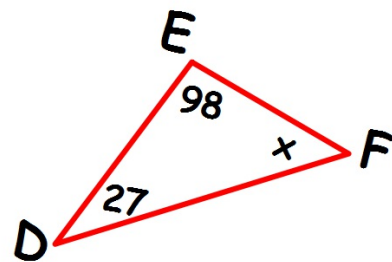
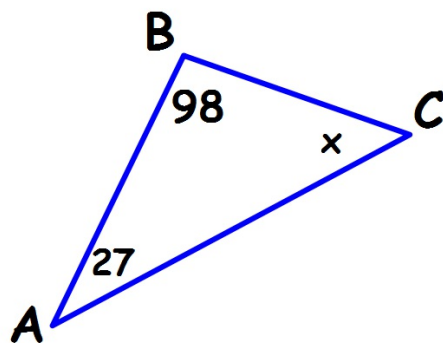
### Learning Targets:

- Identify Similar Triangles
- Use Indirect Measurement to Find Missing Lengths

## Identifying Similar Triangles

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**Key Idea:** When 2 angles in one triangle are congruent to 2 angles in another triangle, the third angles are also congruent and the triangles are **SIMILAR**.



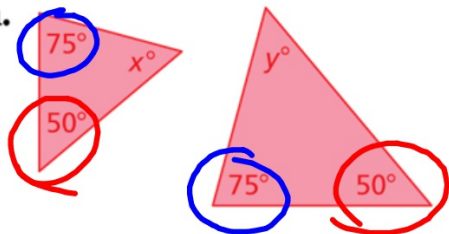
↪ Triangle ABC is **SIMILAR** to Triangle DEF

## Identifying Similar Triangles: Example #1

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Tell whether the triangles are similar. Explain.

a.



Yes b/c  
they have 2  
pairs of  
congruent  $\angle$ 's

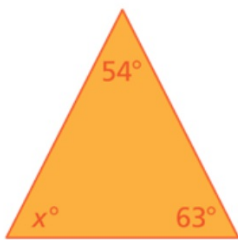
$$x \text{ must} = y$$

## Identifying Similar Triangles: Example #2

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Tell whether the triangles are similar. Explain. Find the missing angle!

b.

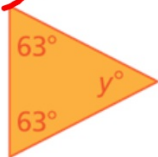


Check

Write and solve an equation to find  $x$ .

$$54 + 63 + x = 180$$

$$x = 63$$

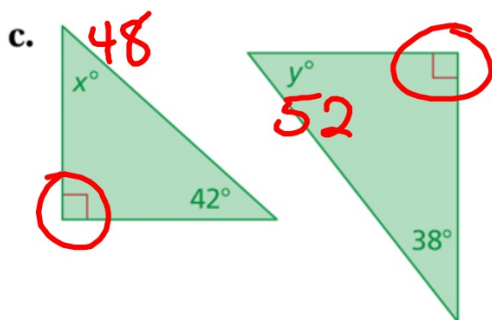


Yes

## Identifying Similar Triangles: Example #3

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Tell whether the triangles are similar. Explain.



Write and solve an equation to find  $x$ .

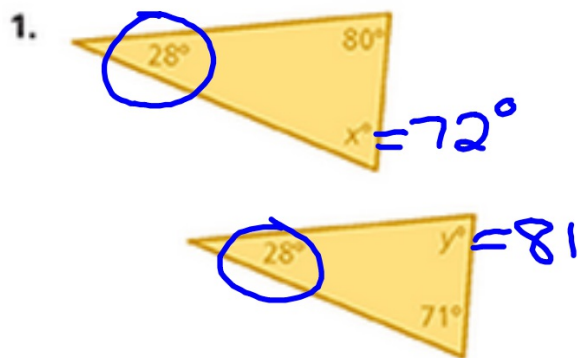
$$90 + 42 + x = 180$$
$$x = 48$$

No

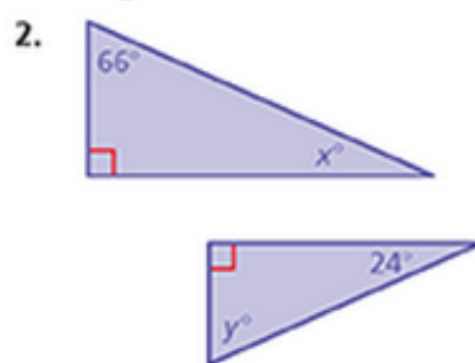
## Identifying Similar Triangles: ON YOUR OWN!

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Tell whether the triangles are similar. Explain.

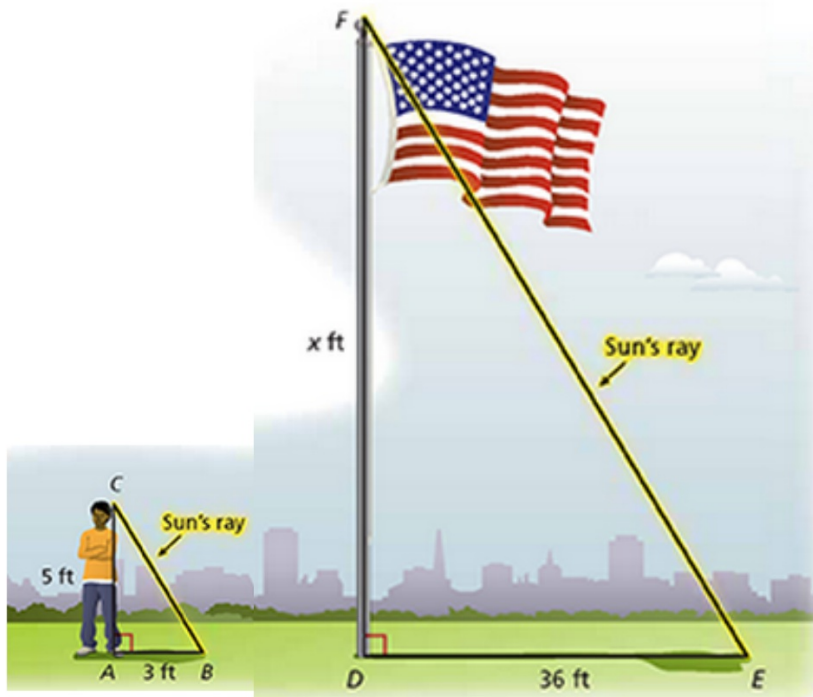


No,  $x=72$   $y=81$   
They don't have 2 pairs  
of congruent angles



Yes  $x=24$   $y=66$   
They do have 2 pairs  
of congruent angles

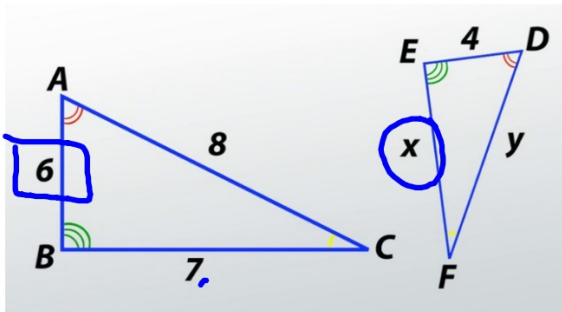
**Indirect Measure** uses similar figures to find a missing measure when it is difficult to find it directly.



To solve questions using Indirect Measure you need to set up **Proportions!**

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**Remember:** Ratios of Corresponding side lengths in similar figures are equal.



$$\frac{ABC}{DEF} \quad \frac{6}{4} = \frac{7}{x}$$

$$6x = 7 \cdot 4$$

$$\frac{6x}{6} = \frac{28}{6} = 4 \frac{2}{3}$$



## Indirect Measure: Example #1

### Write and Solve the Proportion

Ratios of Corresponding side lengths in similar figures are equal.

$$\frac{5}{3} = \frac{x}{36}$$

$$3x = 5 \cdot 36$$

$$\frac{x}{5} = \frac{36}{3}$$

Scale factor  
 $\neq 12$   
 $5 \neq 12 = 60$

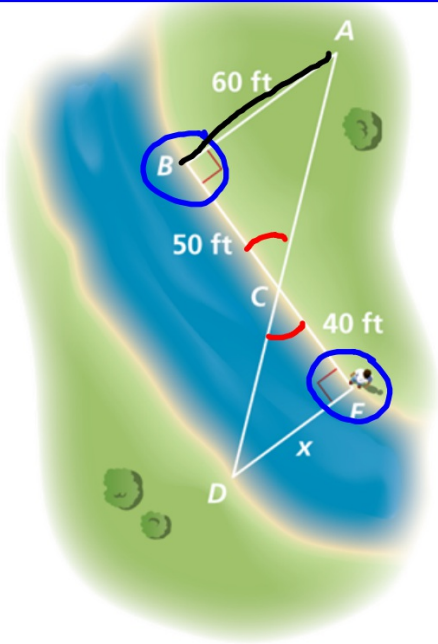


$$x = 60$$

## Indirect Measure: Example #2

Prove  $\triangle$ 's Similar & Write and Solve the Proportion

Find the distance  
Across the River



1st Both have  $90^\circ$   $\angle$   
Vertical  $\angle$ 's are  $\cong$

2nd

$$\frac{60}{x} = \frac{50}{40}$$
$$\frac{50}{50} x = \frac{2400}{50}$$

$$x = 48$$

## Homework

pg 130-131

#2 and #6-16

### Hints

#11 and 12 - PROVE angle  
measures!

You may want to draw a picture  
for #15

#16

Use  
5' 3"