

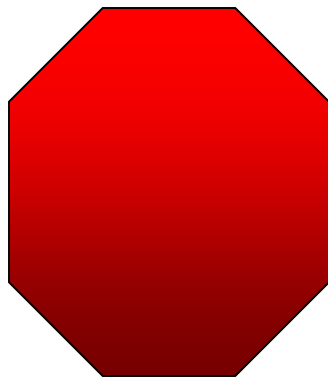
# Similar Figures

(Not exactly the same,  
but pretty close!)

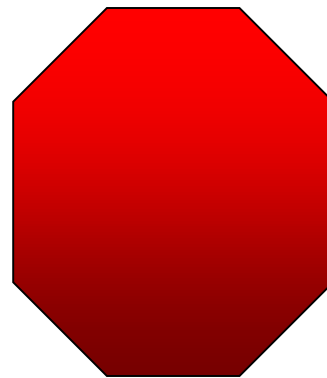
Let's do a little  
review work  
before discussing  
similar figures.

# Congruent Figures

- In order to be congruent, two figures must be the same size and same shape.

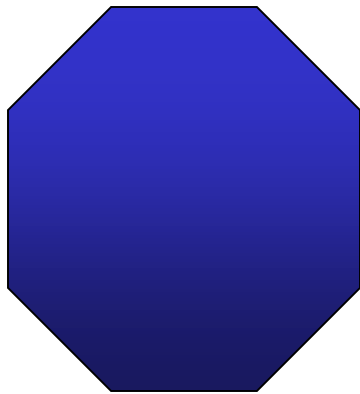


$\cong$

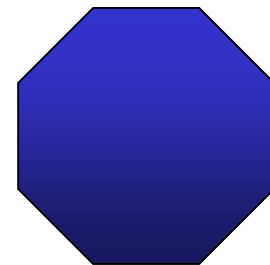


# Similar Figures

- Similar figures must be the same shape, but their sizes may be different.



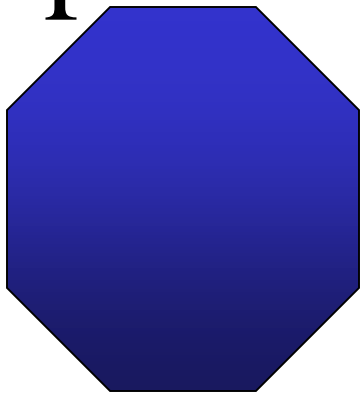
$\sim$



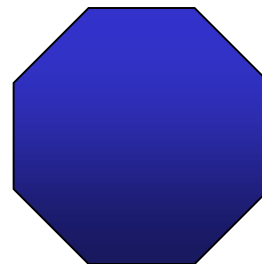
# Similar Figures

~ This is the symbol that means “similar.”

These figures are the same shape but different sizes.

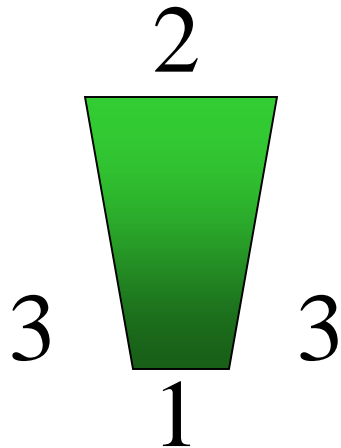


~

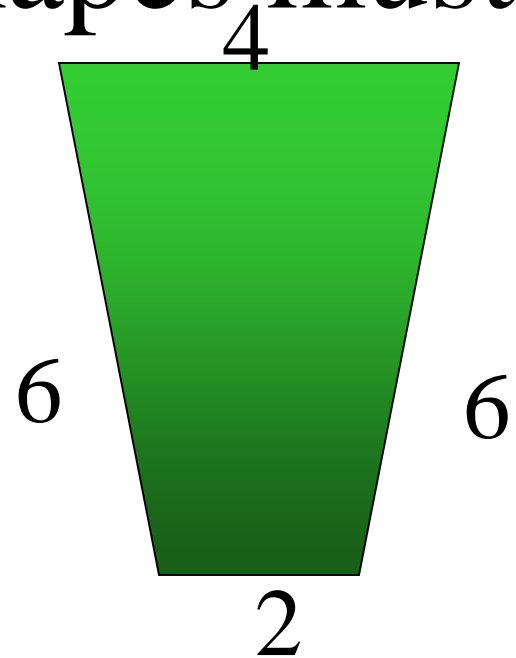


# SIZES

- Although the size of the two shapes can be different, the sizes of the two shapes must differ by a factor.

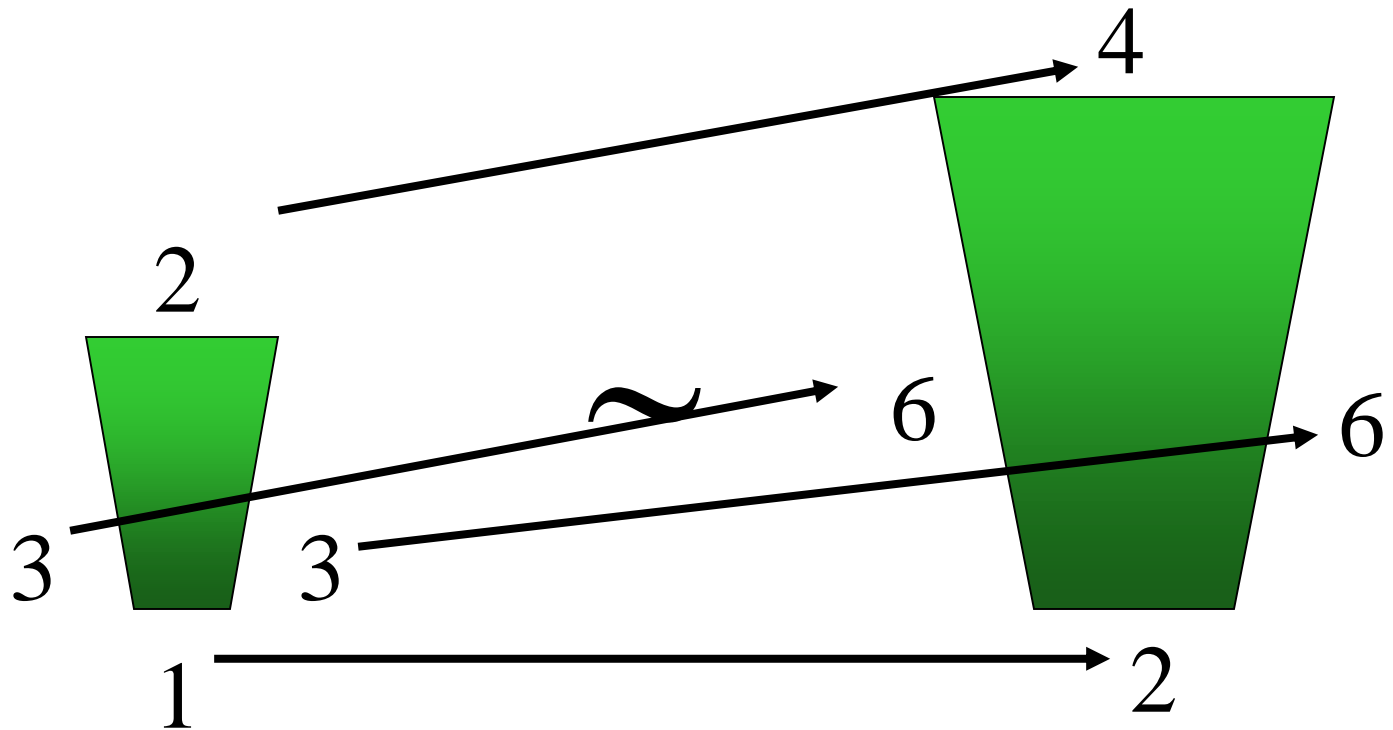


~



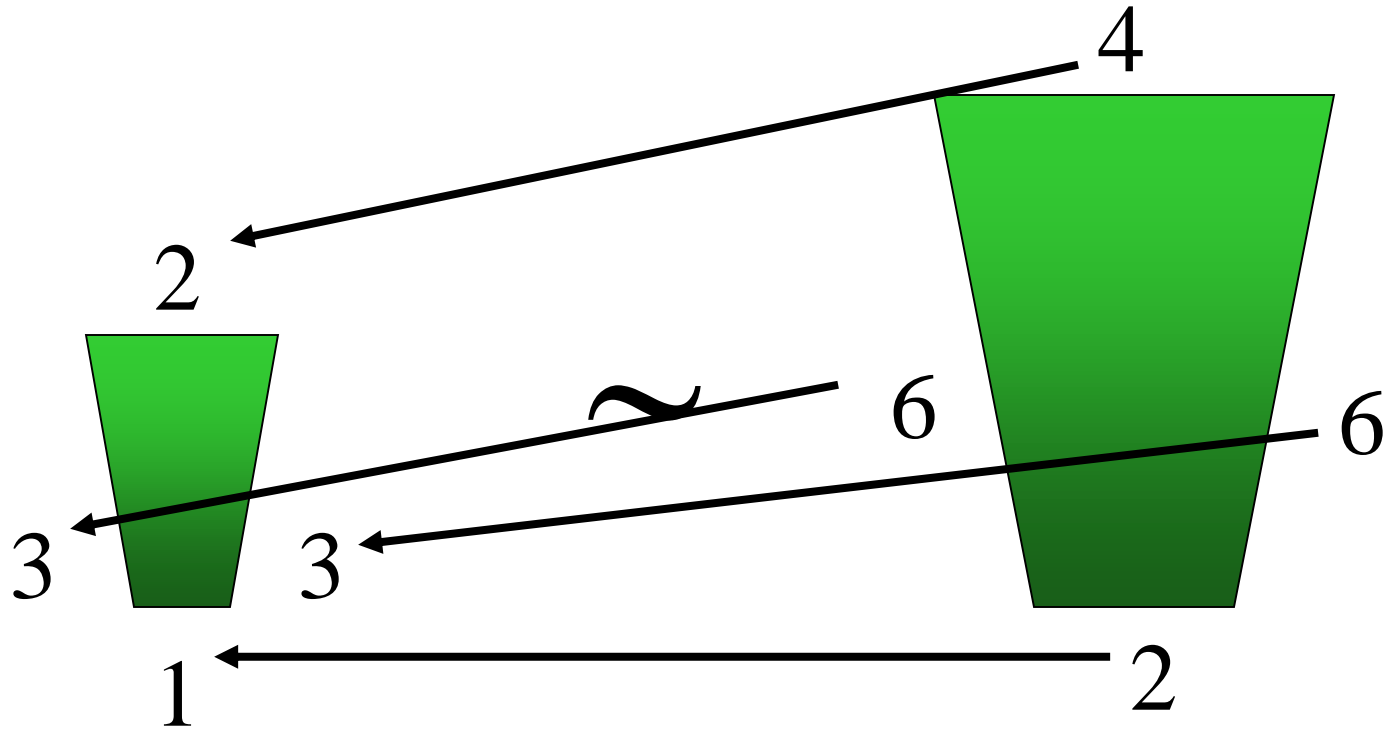
# SIZES

- In this case, the factor is  $\times 2$ .



# SIZES

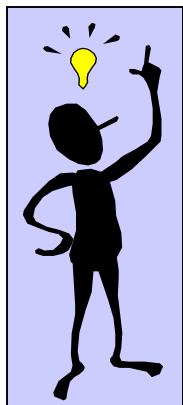
- Or you can think of the factor as  $\div 2$ .





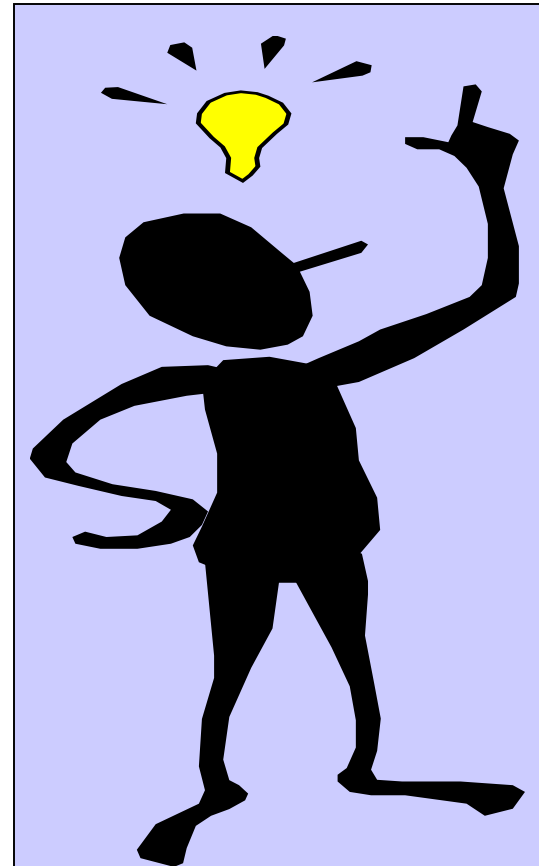
# Enlargements

- When you have a photograph enlarged, you make a similar photograph.



~

X 3

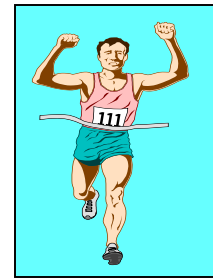


# Reductions

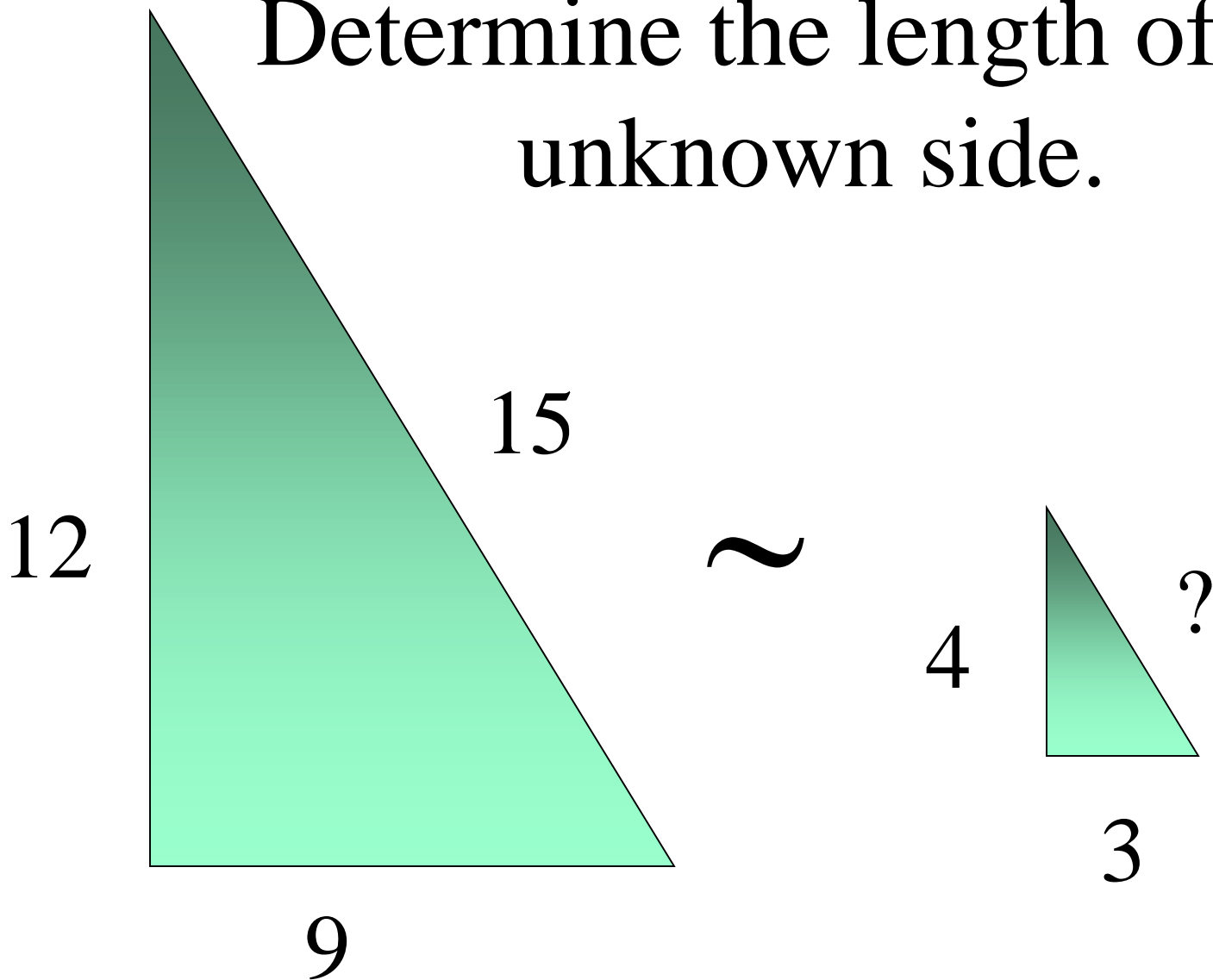
- A photograph can also be shrunk to produce a slide.



$$\begin{array}{c} \div 4 \\ \longrightarrow \\ \sim \end{array}$$



Determine the length of the  
unknown side.



These triangles differ by a factor  
of 3.

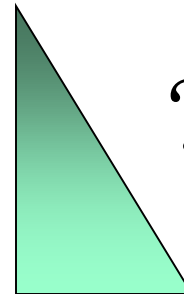
$$15 \div 3 = 5$$

15



$\sim$

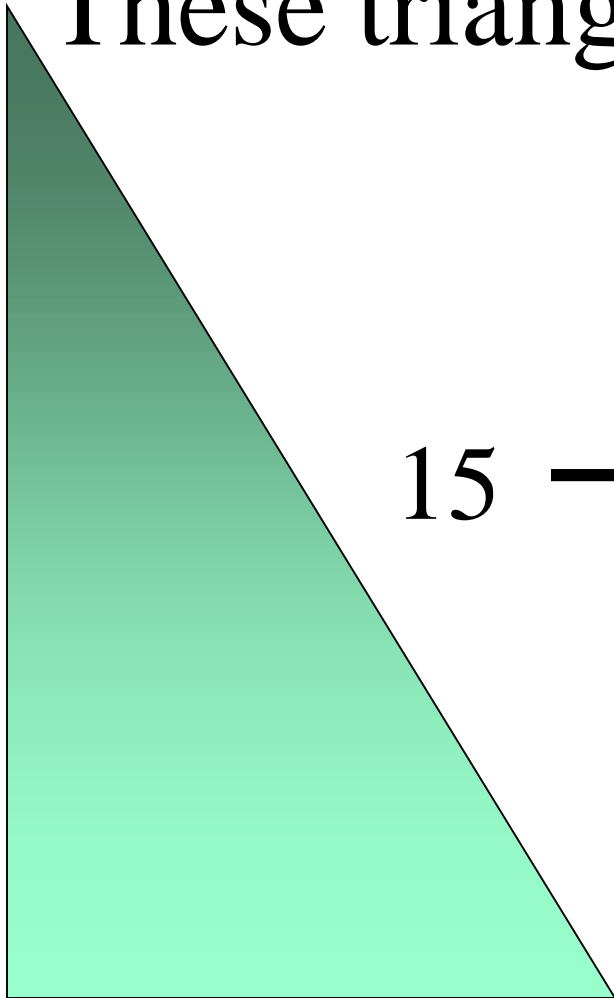
4



?

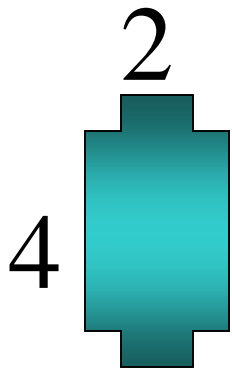
3

12



9

Determine the length of the  
unknown side.

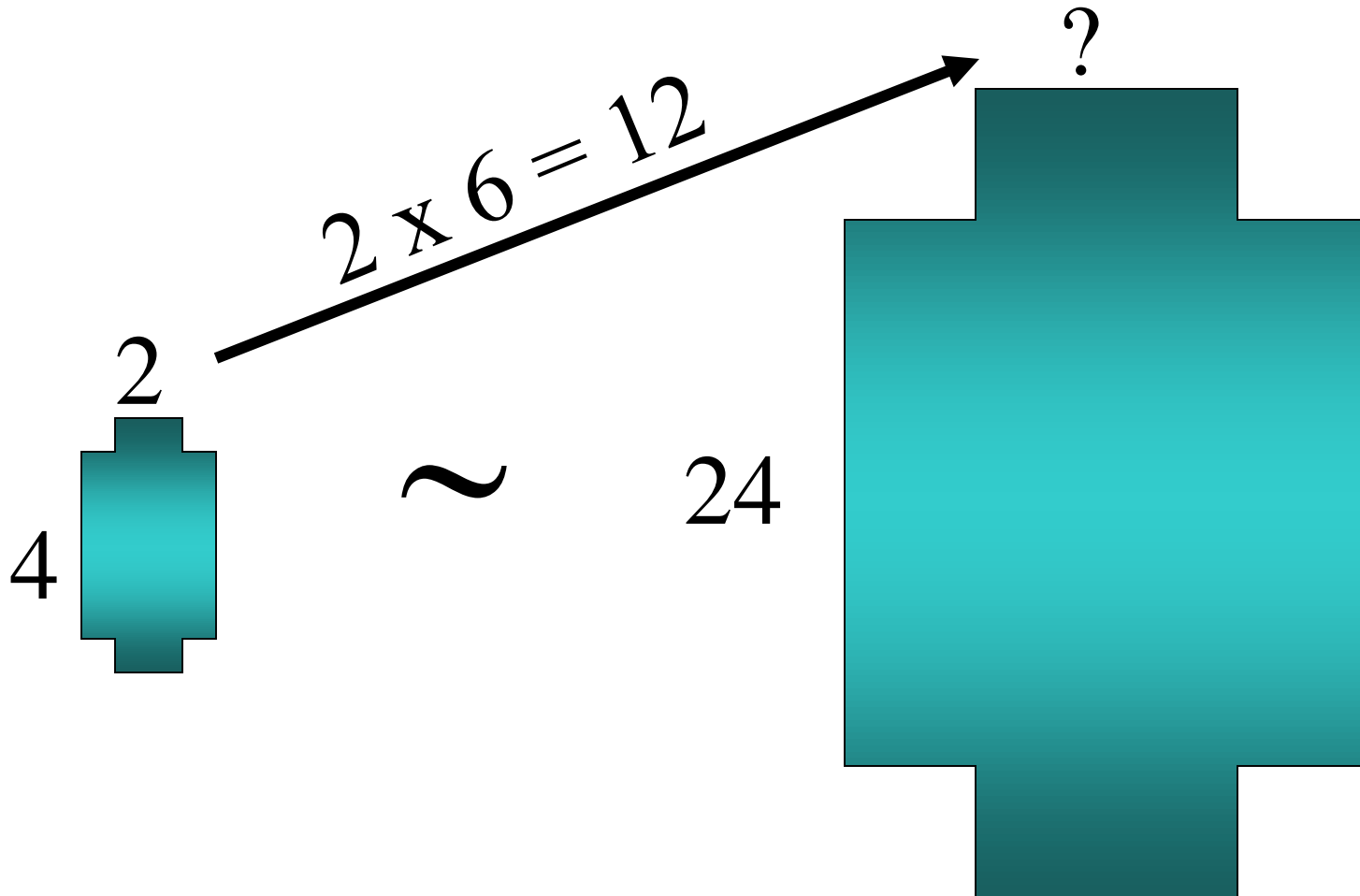


$\sim$

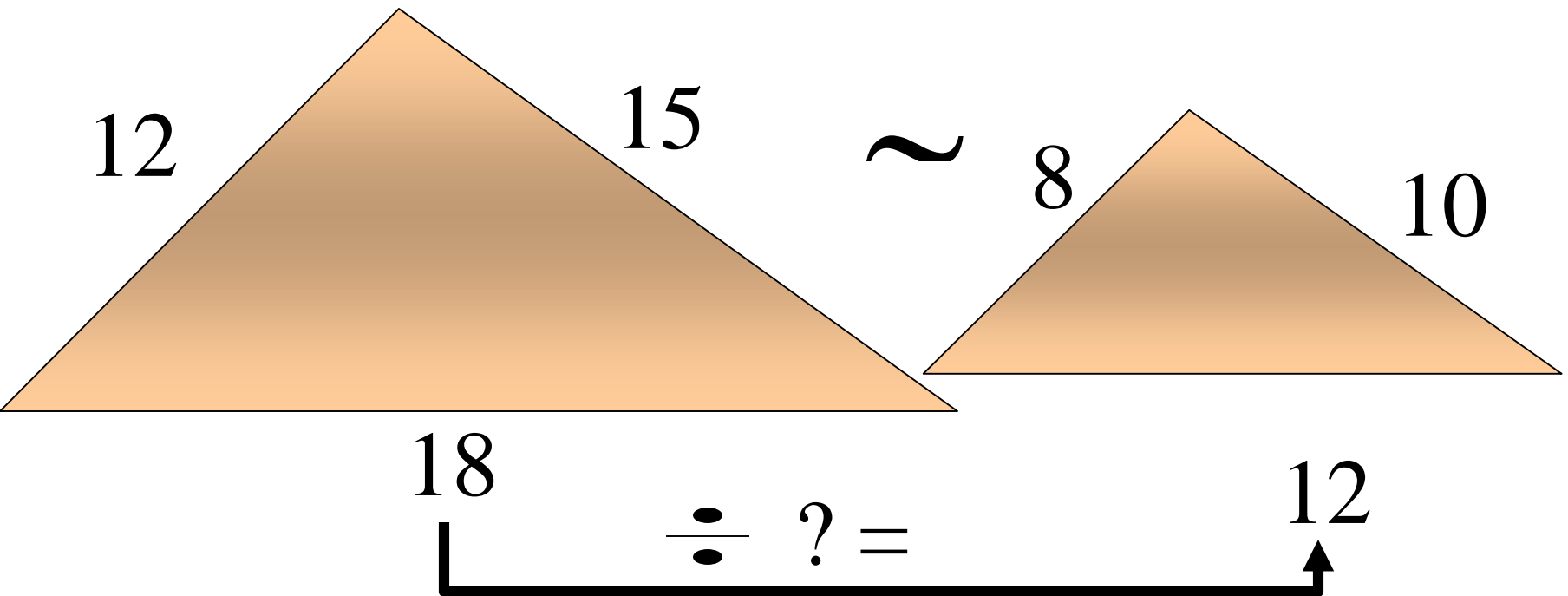
24



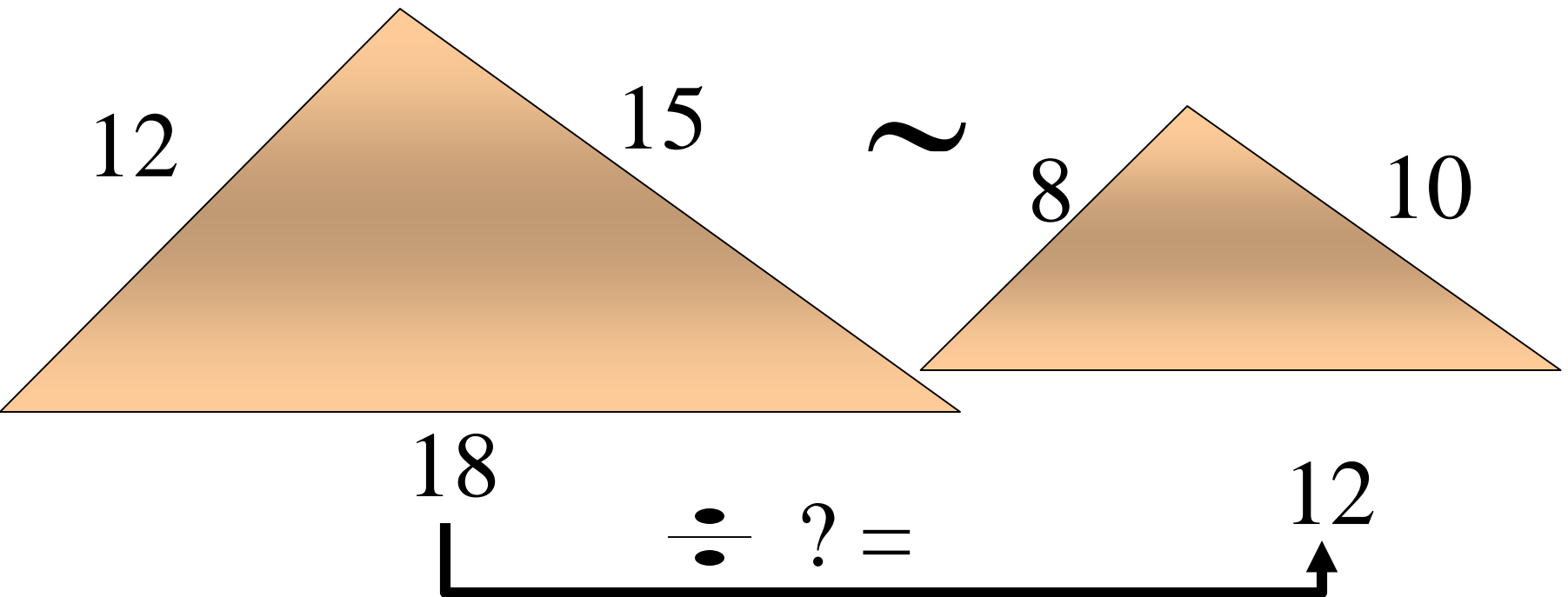
These dodecagons differ by a factor of 6.



Sometimes the factor between 2 figures is not obvious and some calculations are necessary.



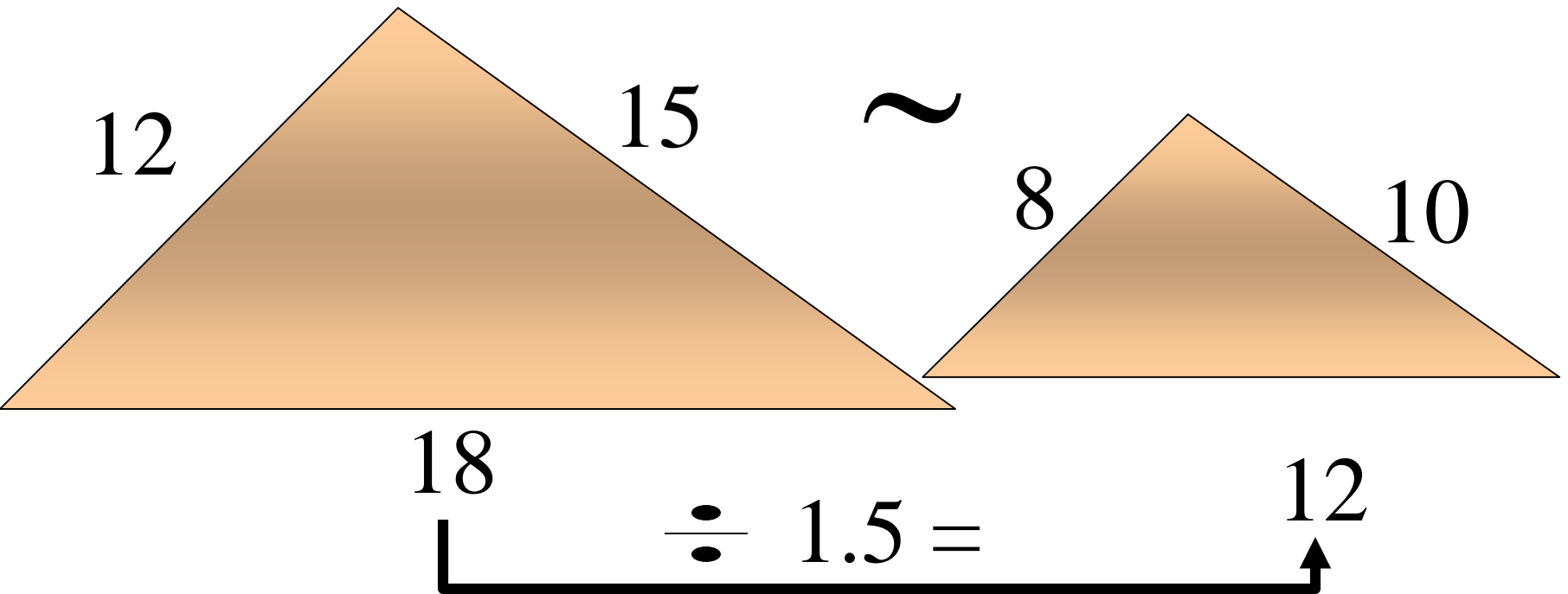
To find this missing factor,  
divide 18 by 12.



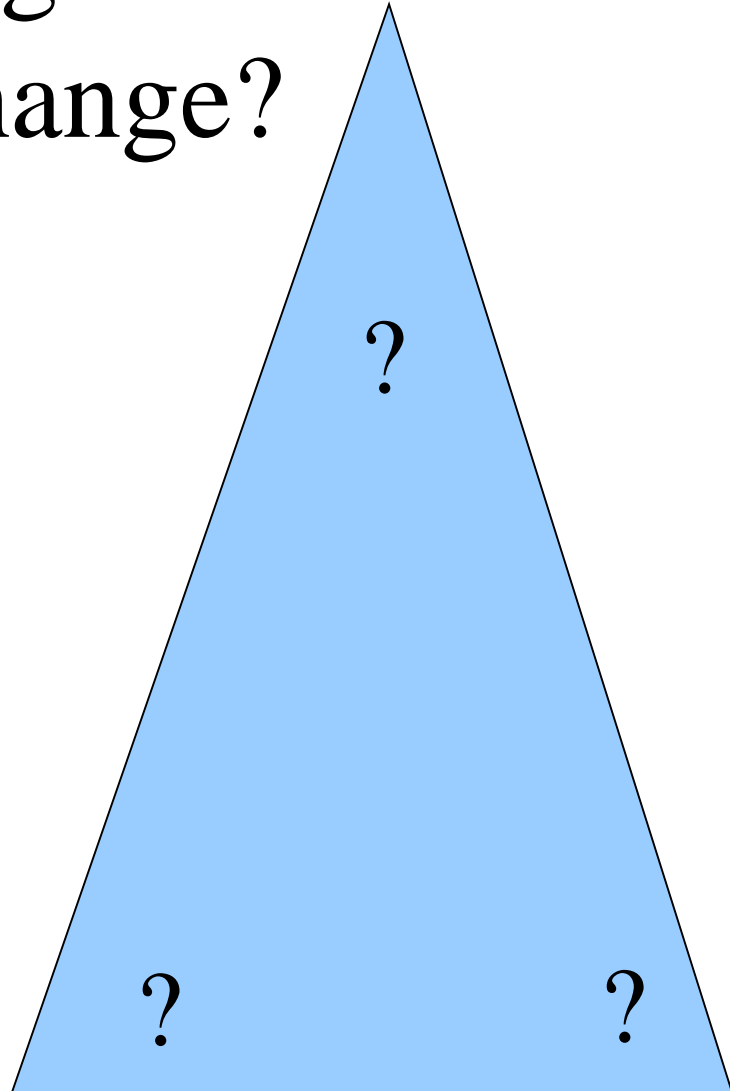
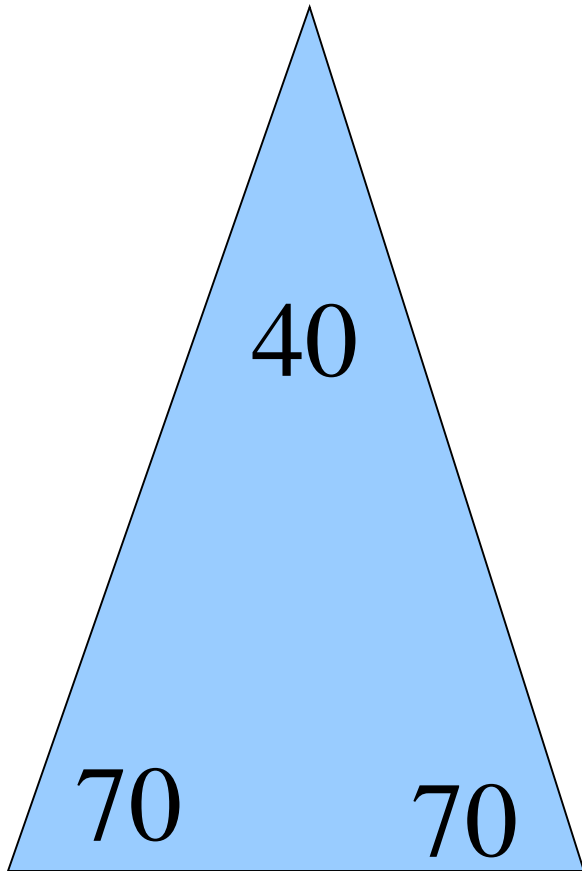


$$18 \text{ divided by } 12 \\ = 1.5$$

The value of the missing  
factor is 1.5.

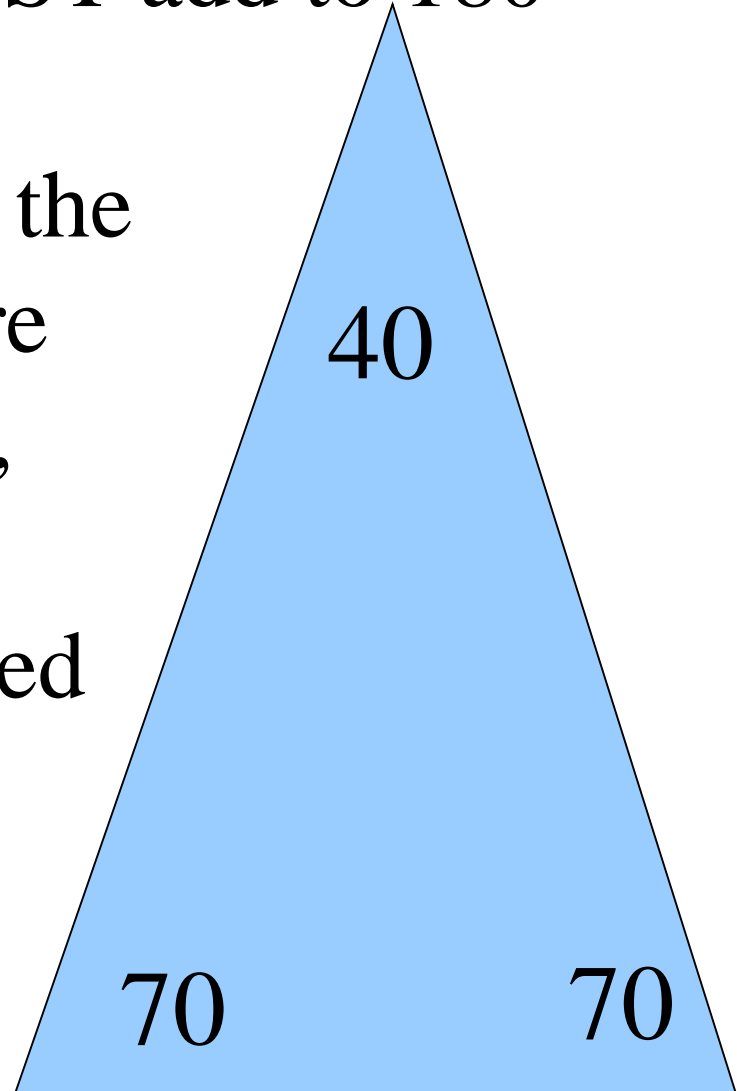
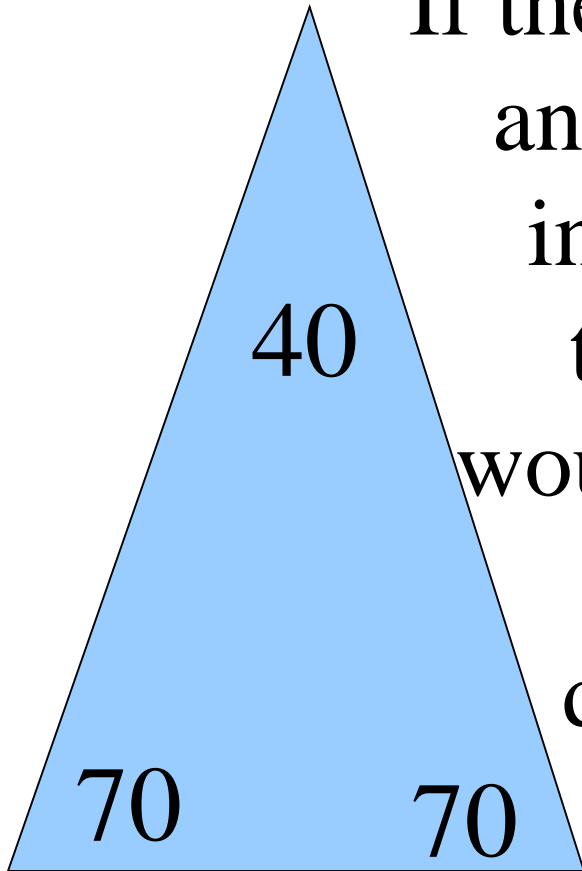


When changing the size of a figure, will the angles of the figure also change?

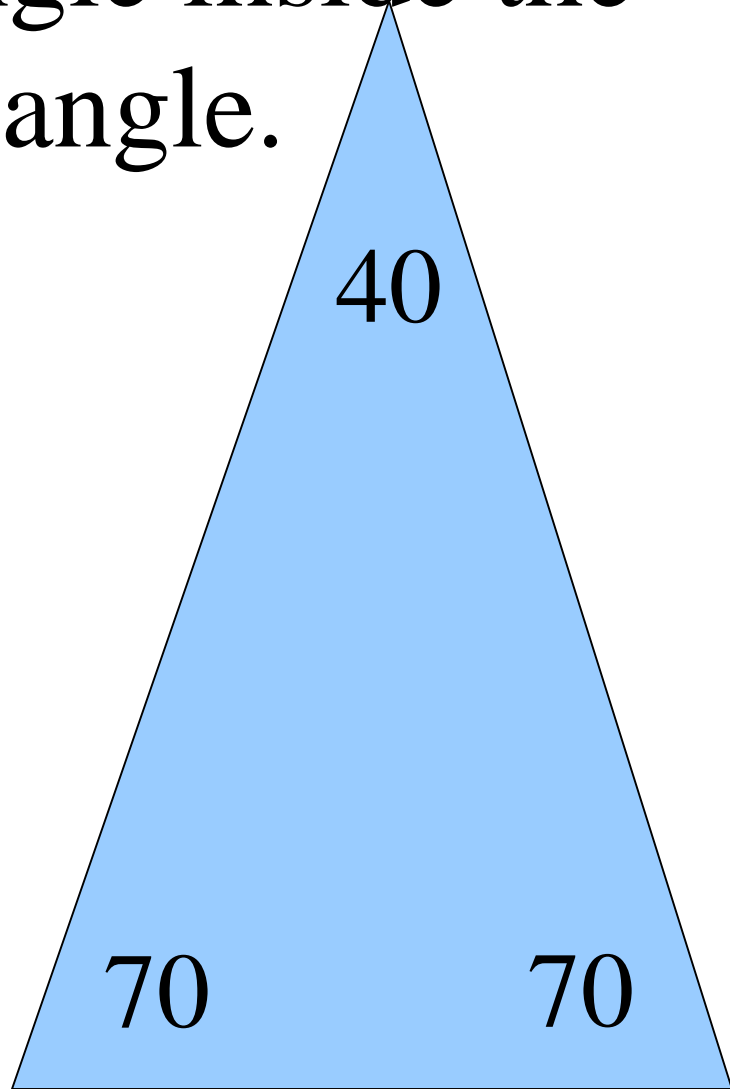
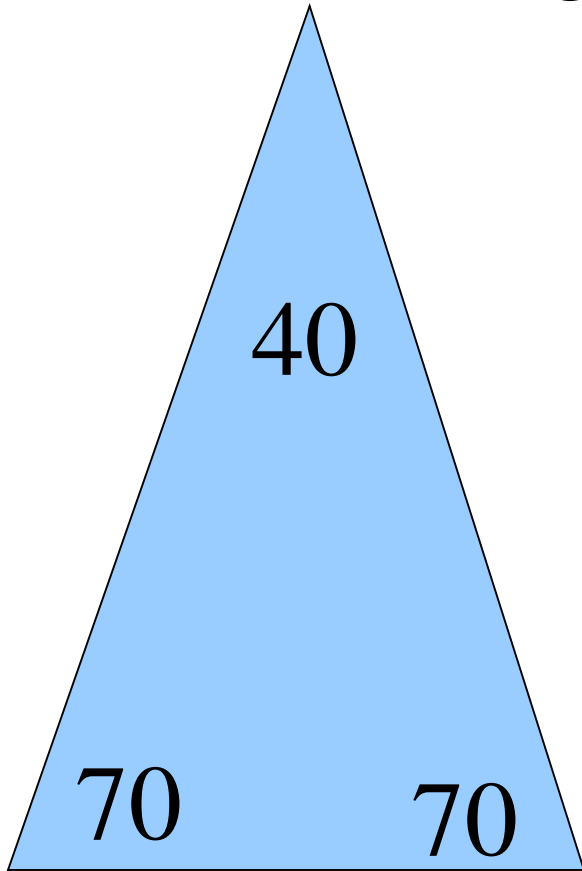


Nope! Remember, the sum of all 3 angles in a triangle **MUST** add to 180 degrees.

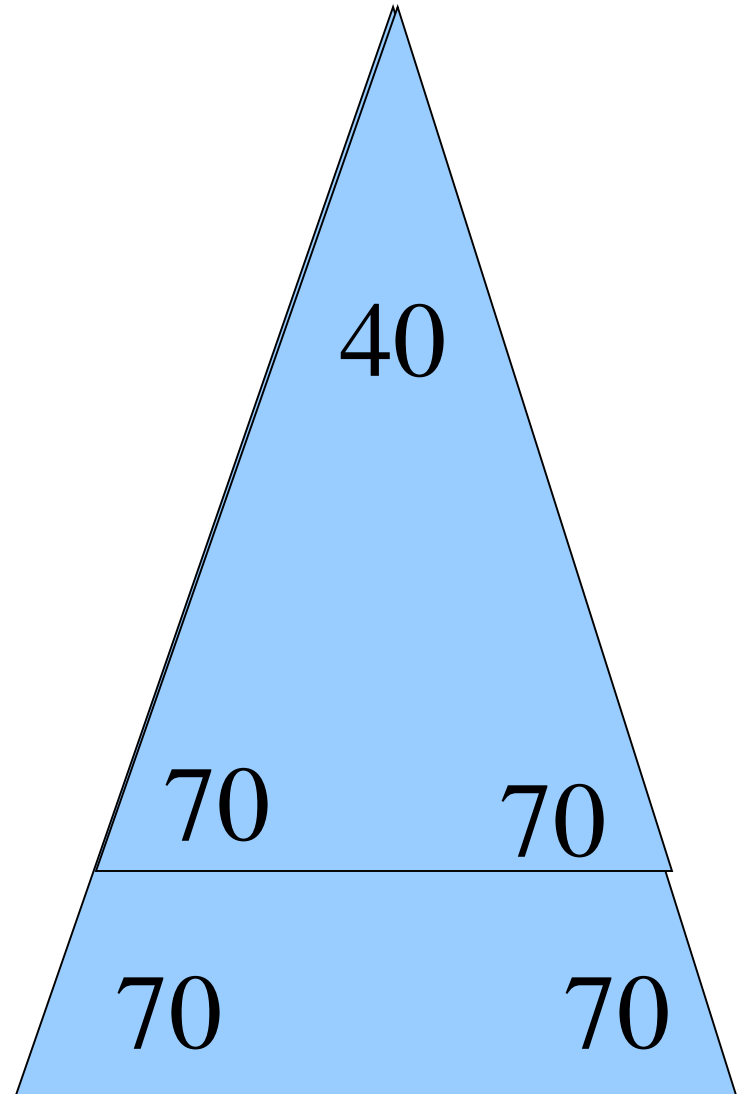
If the size of the angles were increased, the sum would exceed 180 degrees.



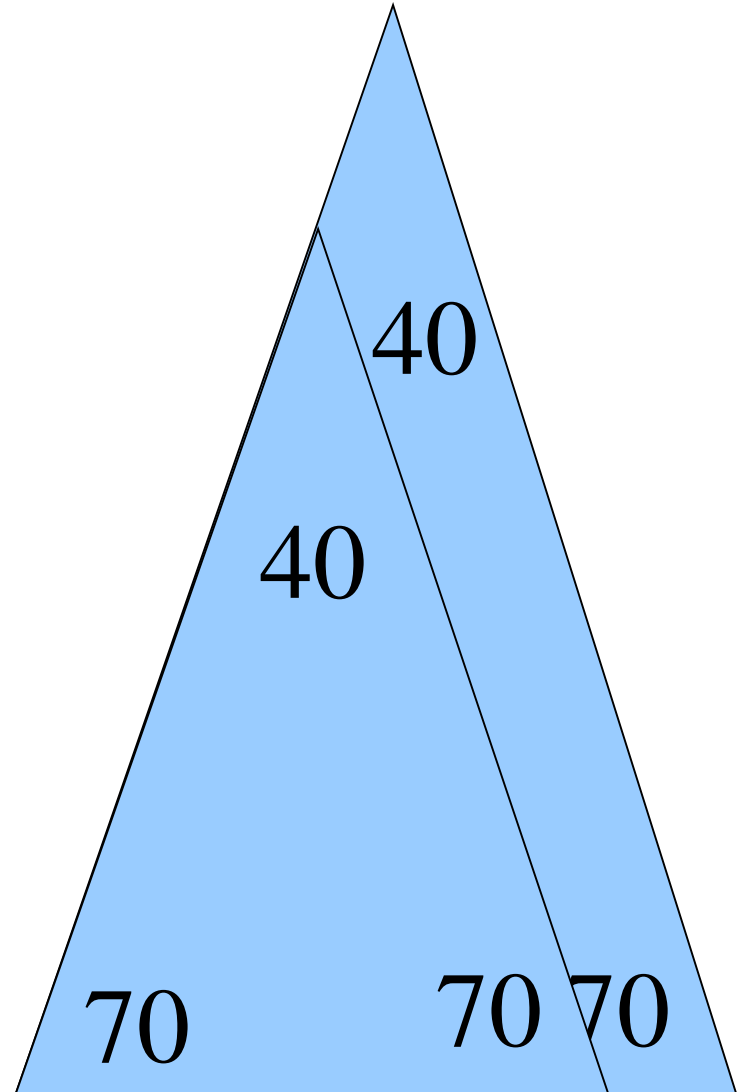
We can verify this fact by placing  
the smaller triangle inside the  
larger triangle.



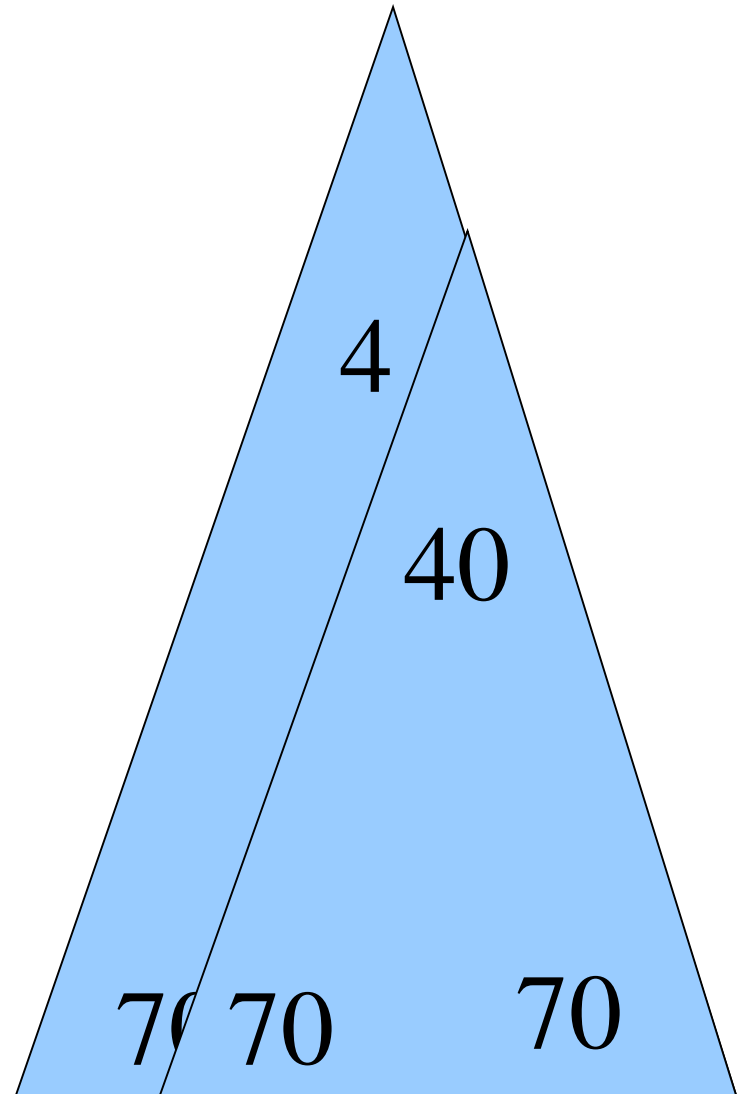
The 40 degree angles  
are congruent.



The 70 degree angles  
are congruent.

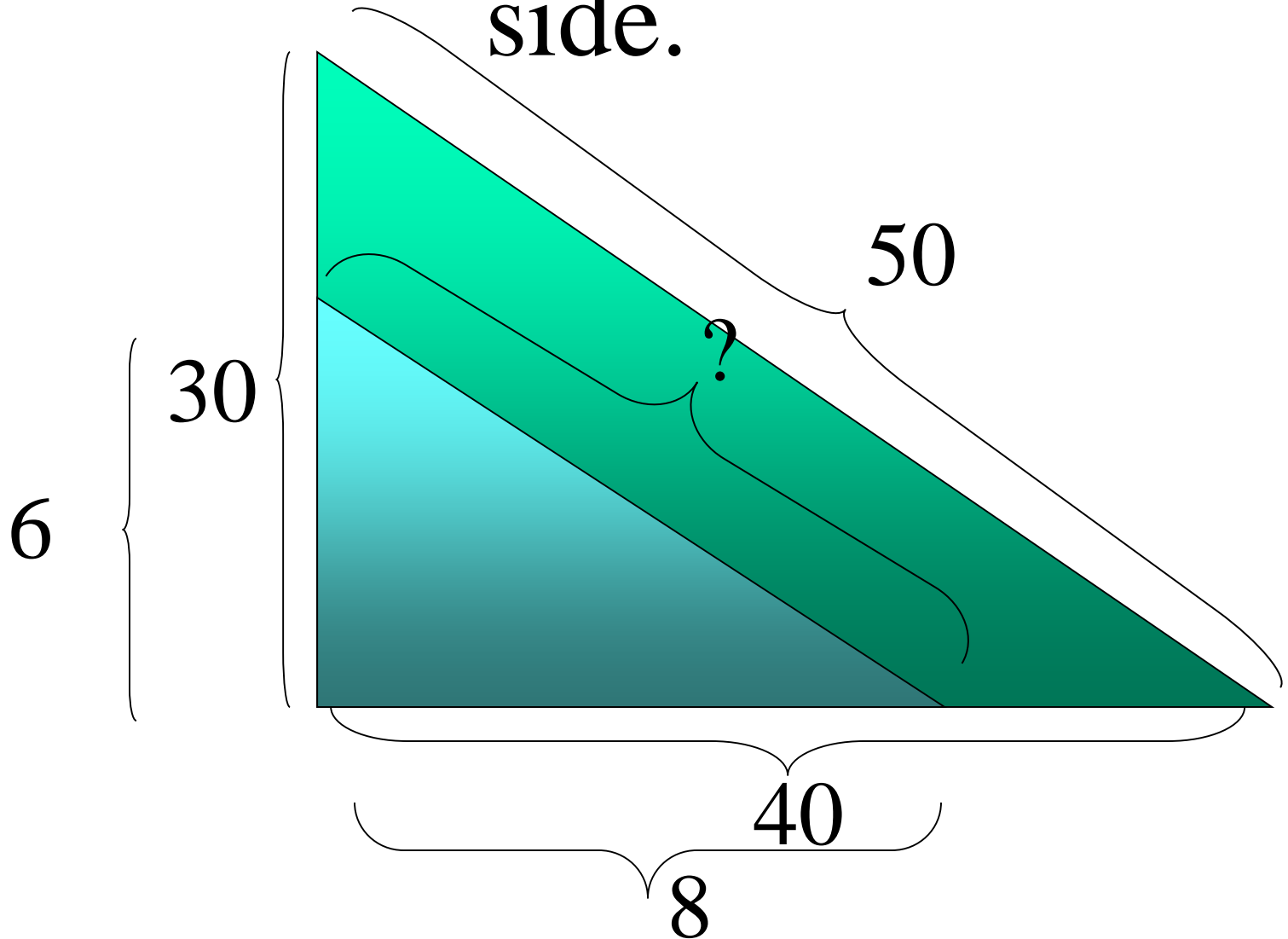


The other 70 degree angles are congruent.

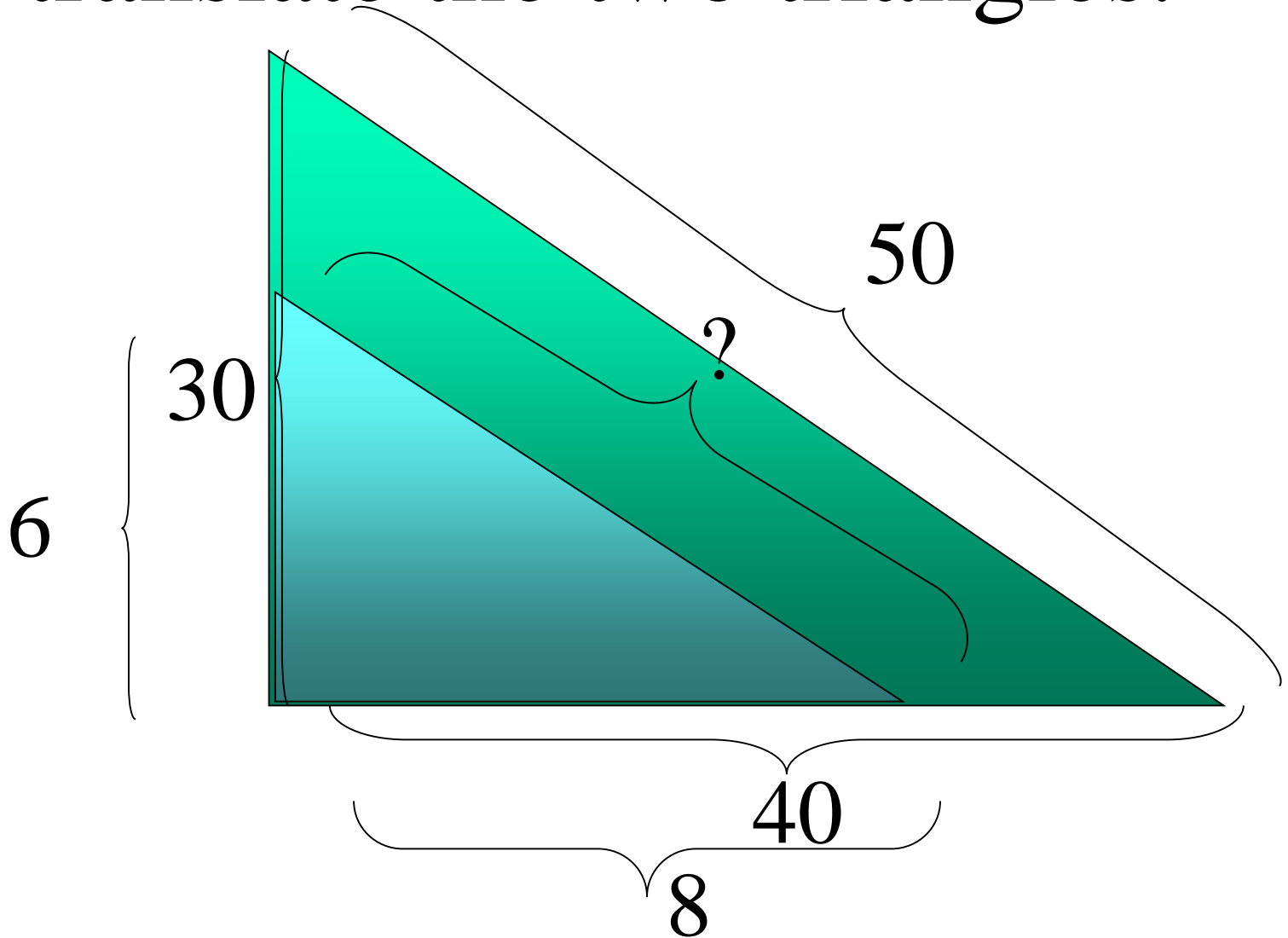




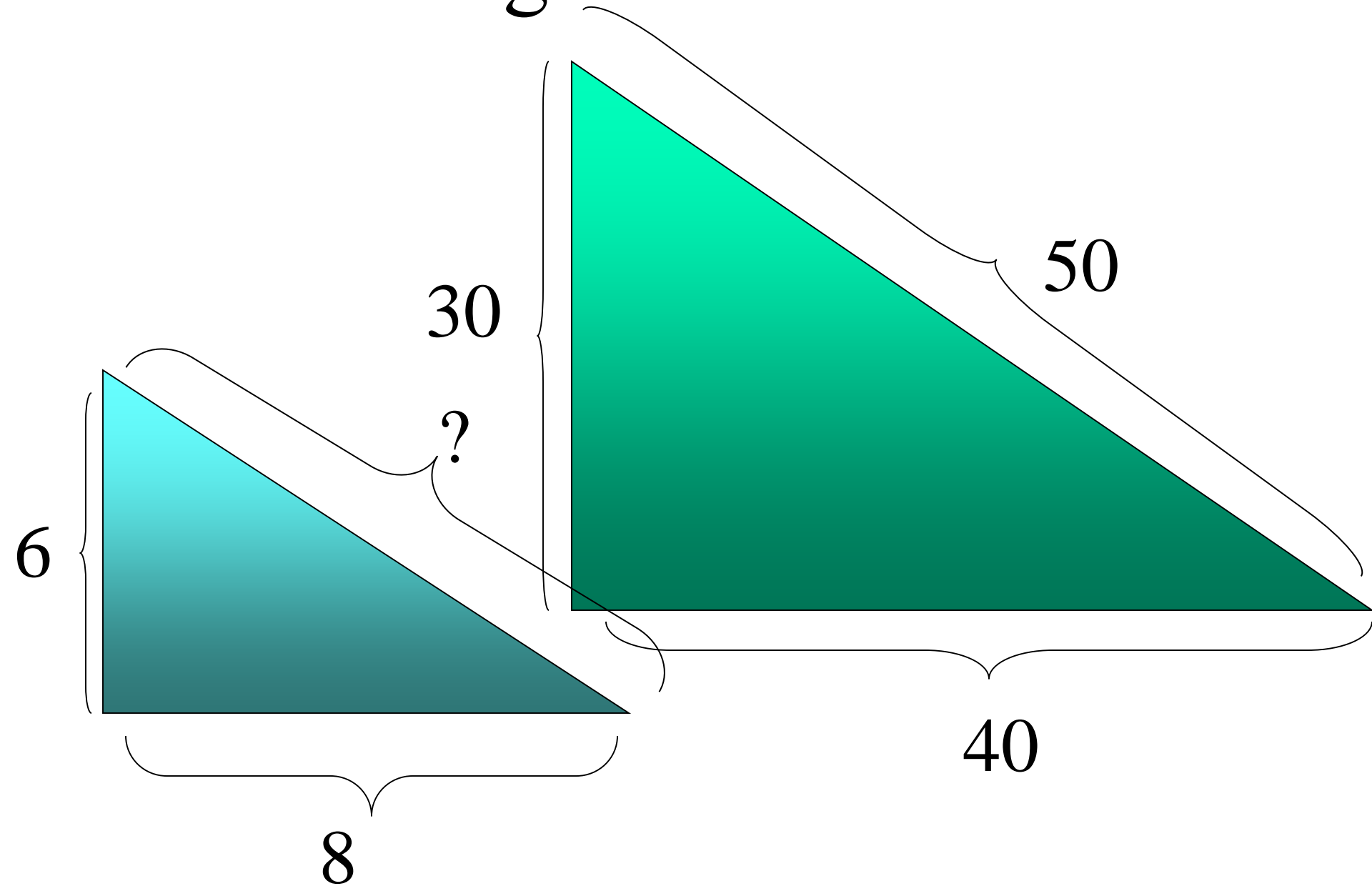
Find the length of the missing side.



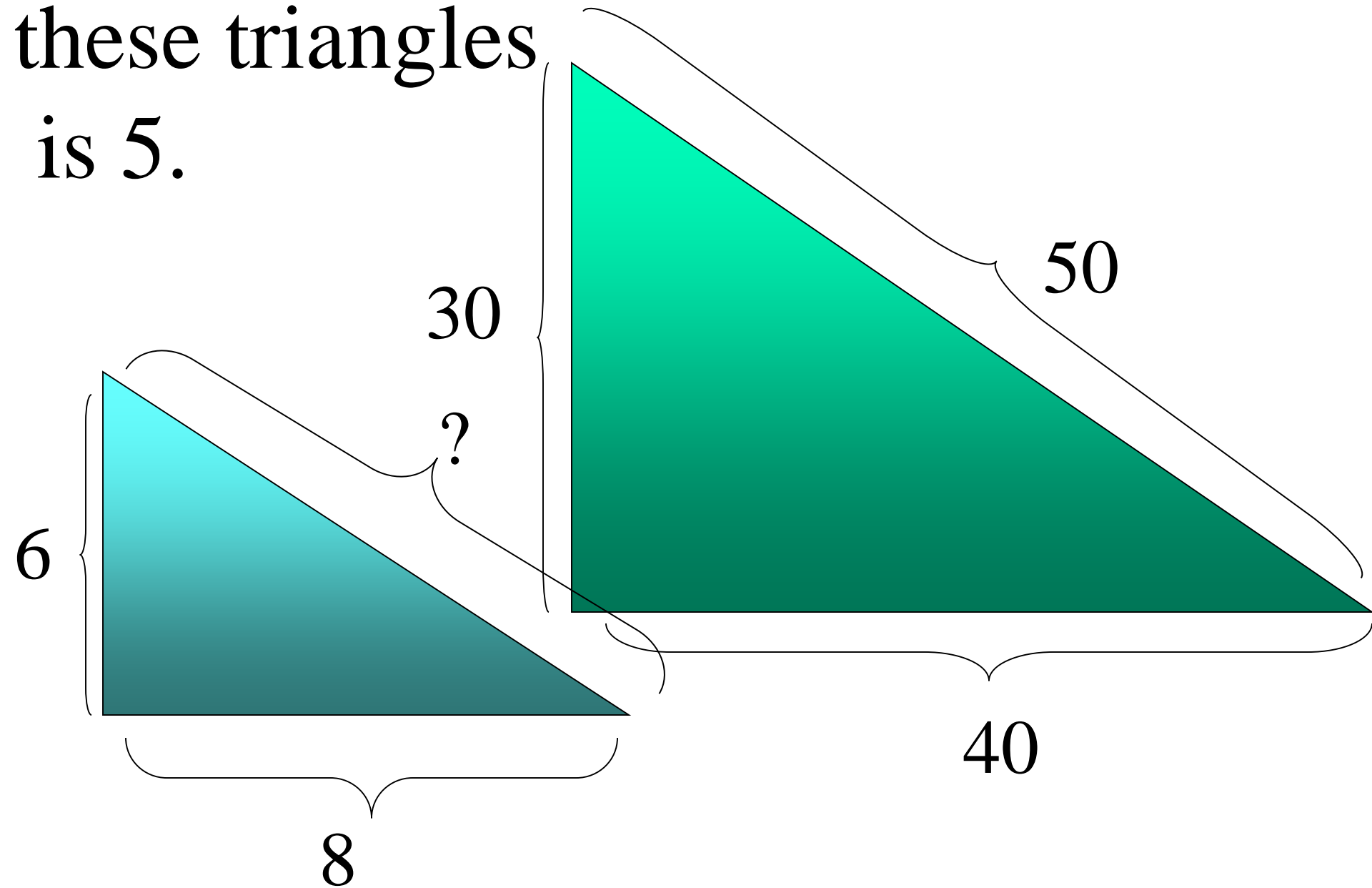
This looks messy. Let's translate the two triangles.



Now “things” are easier to see.

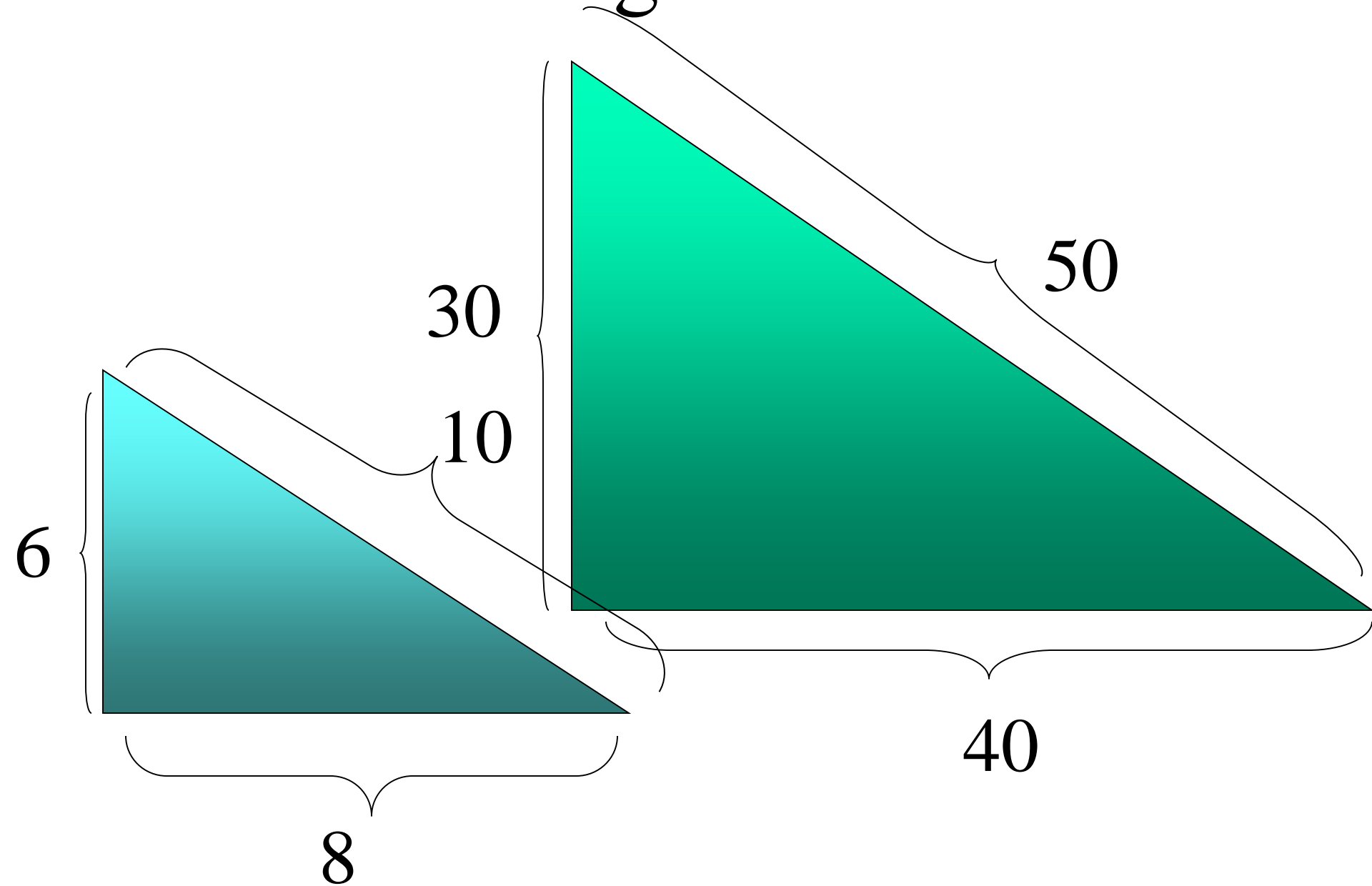


The common factor between  
these triangles  
is 5.



So the length of  
the missing side  
is...?

That's right! It's ten!



Similarity is used to answer real life questions.

- Suppose that you wanted to find the height of this tree.



Unfortunately all that  
you have is a tape  
measure, and you are  
too short to reach the  
top of the tree.



You can measure the length of  
the tree's shadow.



10 feet

Then, measure the length of your shadow.

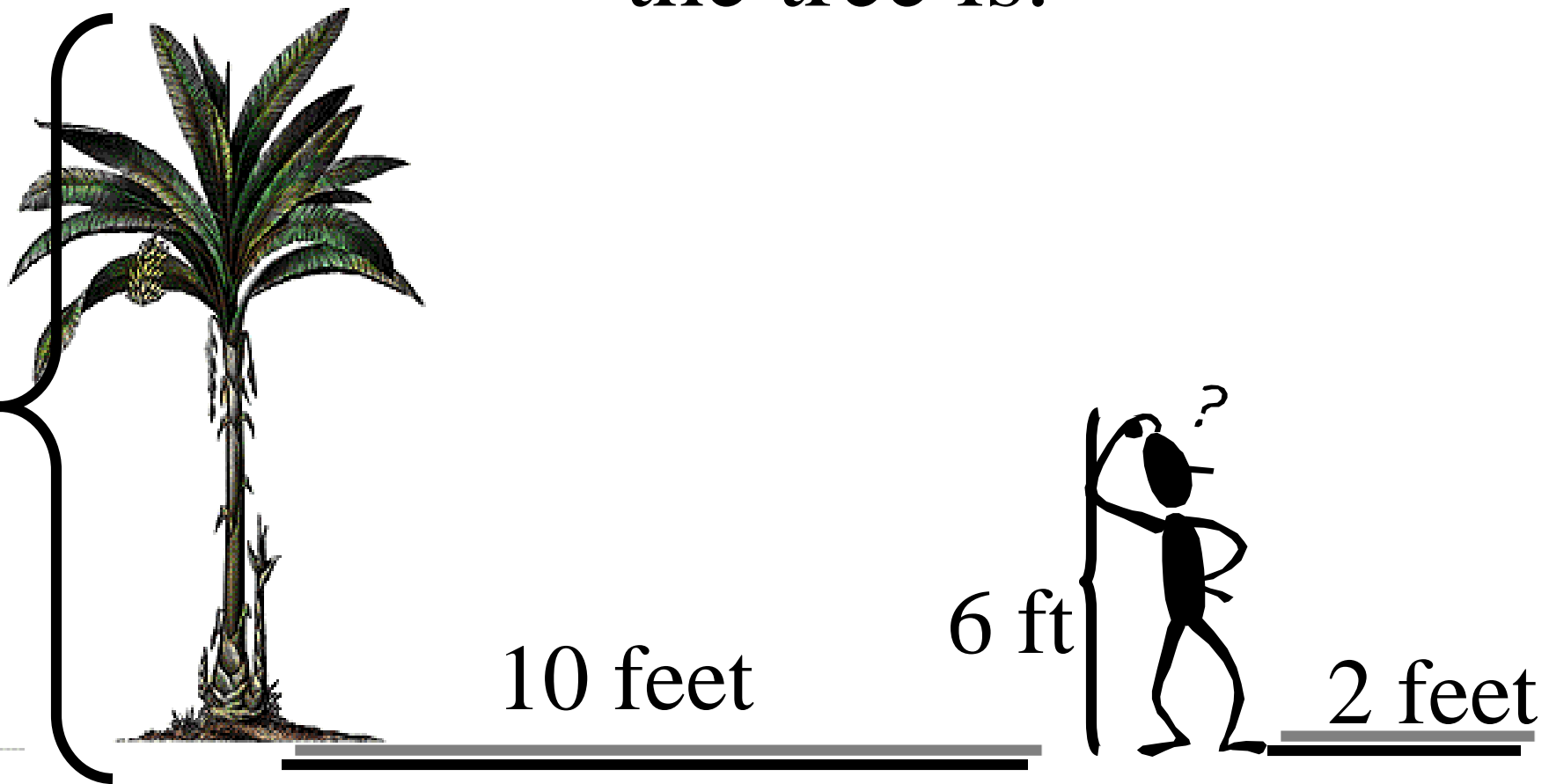


10 feet

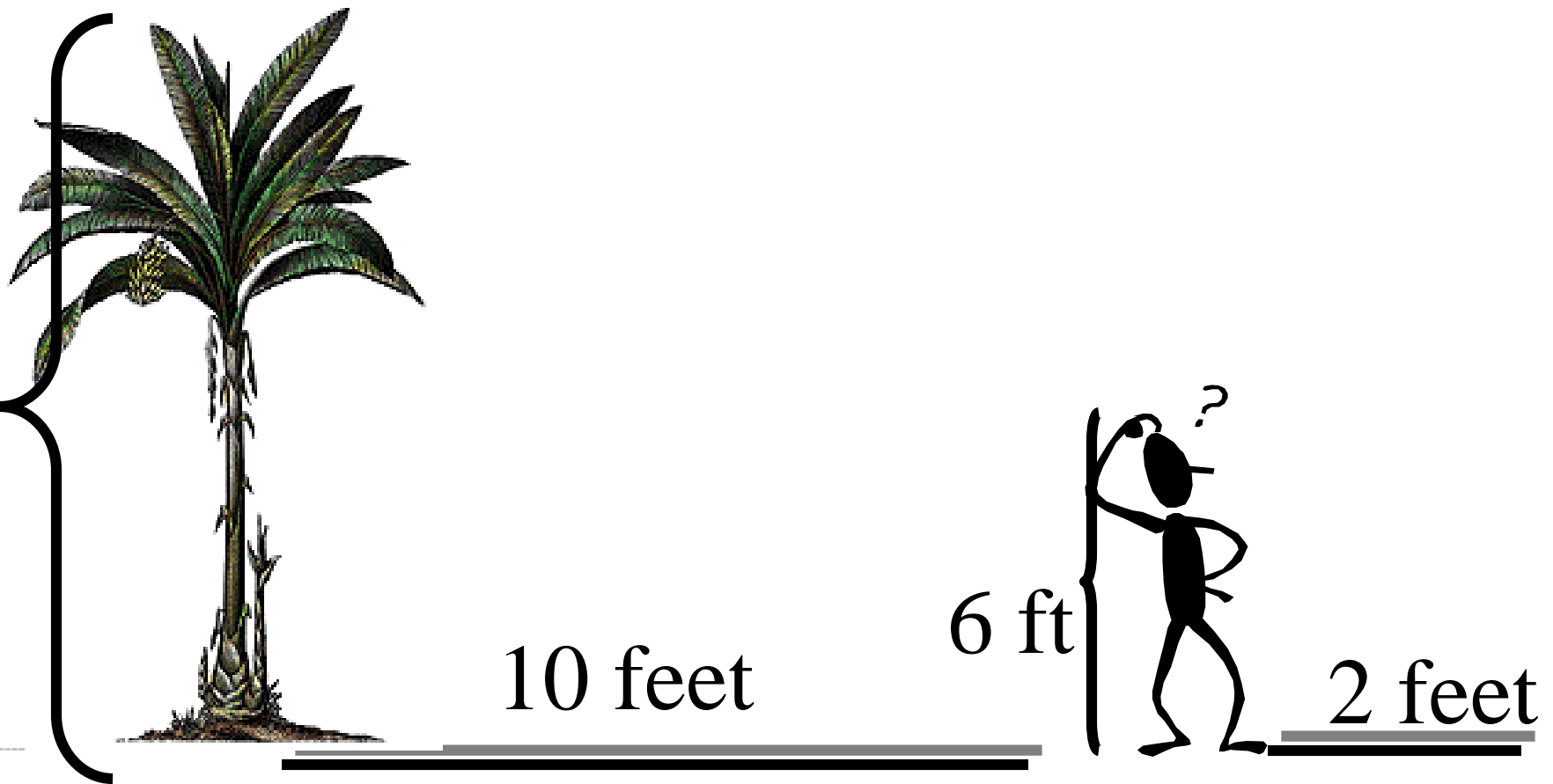


2 feet

If you know how tall you are,  
then you can determine how tall  
the tree is.



The tree must be 30 ft tall. Boy,  
that's a tall tree!



Similar figures “work” just like  
equivalent fractions.

$$\frac{L}{S} = \frac{10}{2} = \frac{x}{6}$$

These numerators and denominators differ by a factor of 3.

$$\frac{10}{2} \xrightarrow{\times 3} \frac{30}{6}$$

Two equivalent fractions are  
called a proportion.

$$\frac{10}{2} = \frac{30}{6}$$

# Similar Figures

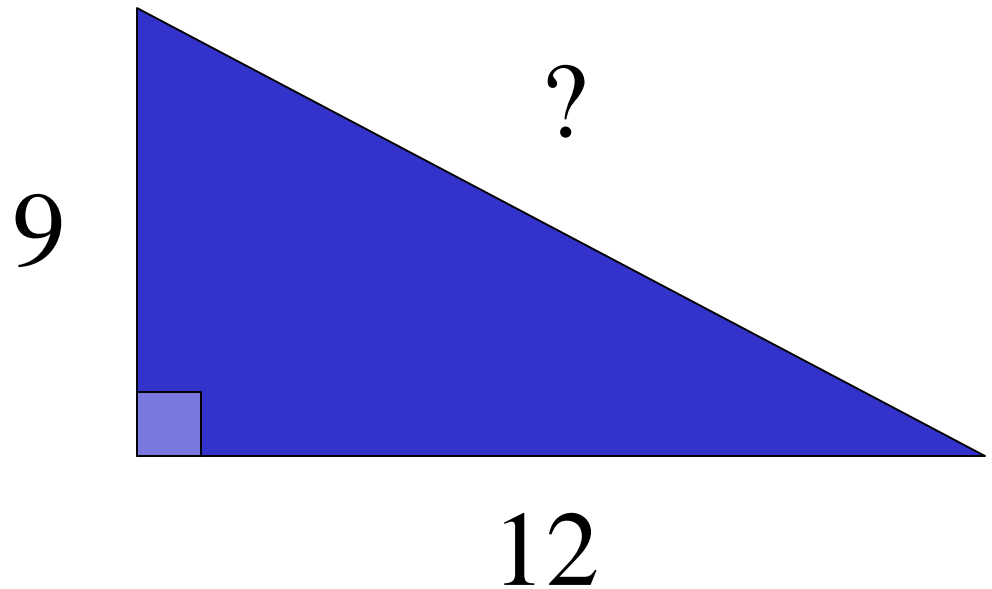
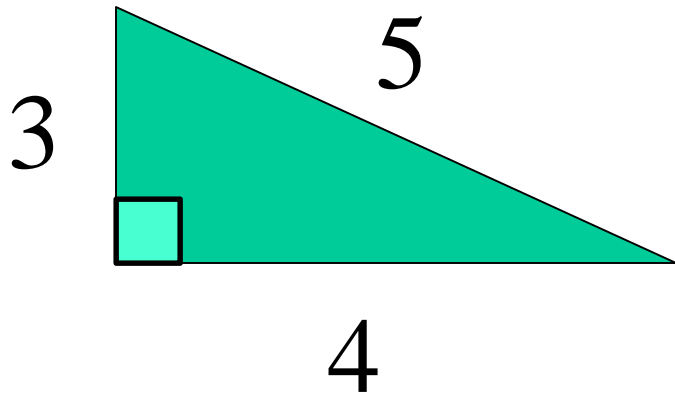
- So, similar figures are two figures that are the same shape and whose sides are proportional.



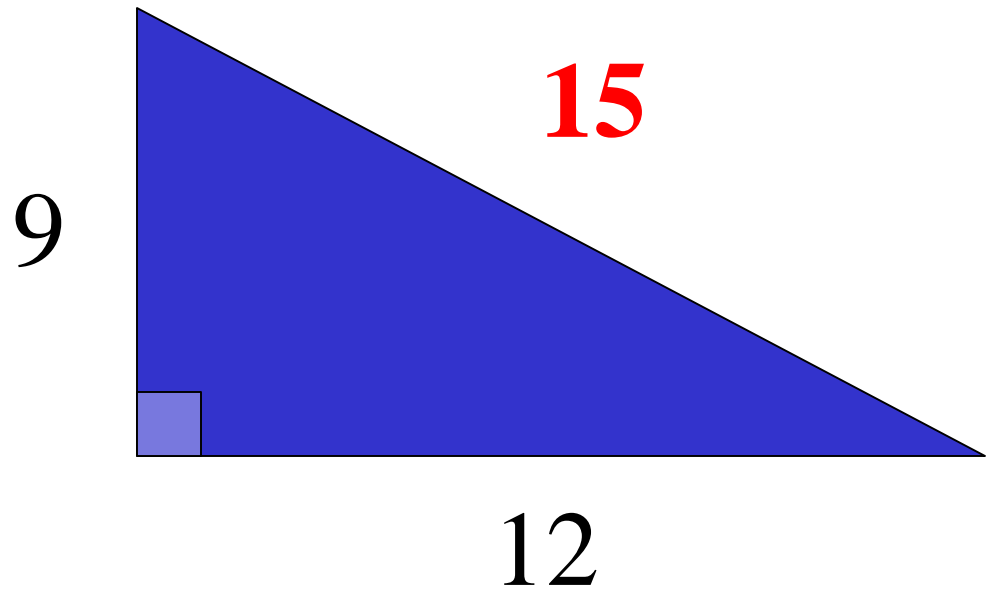
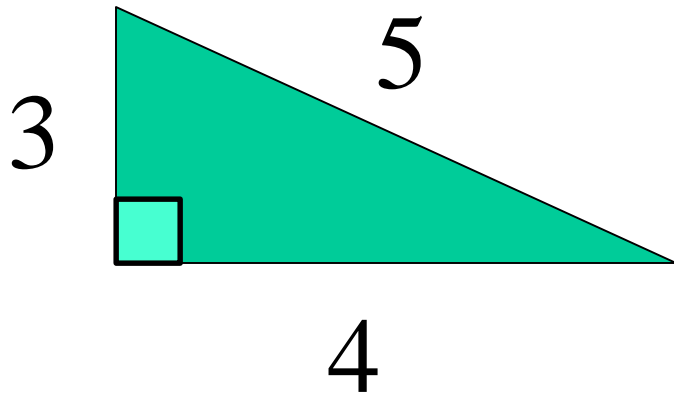
# Practice Time!



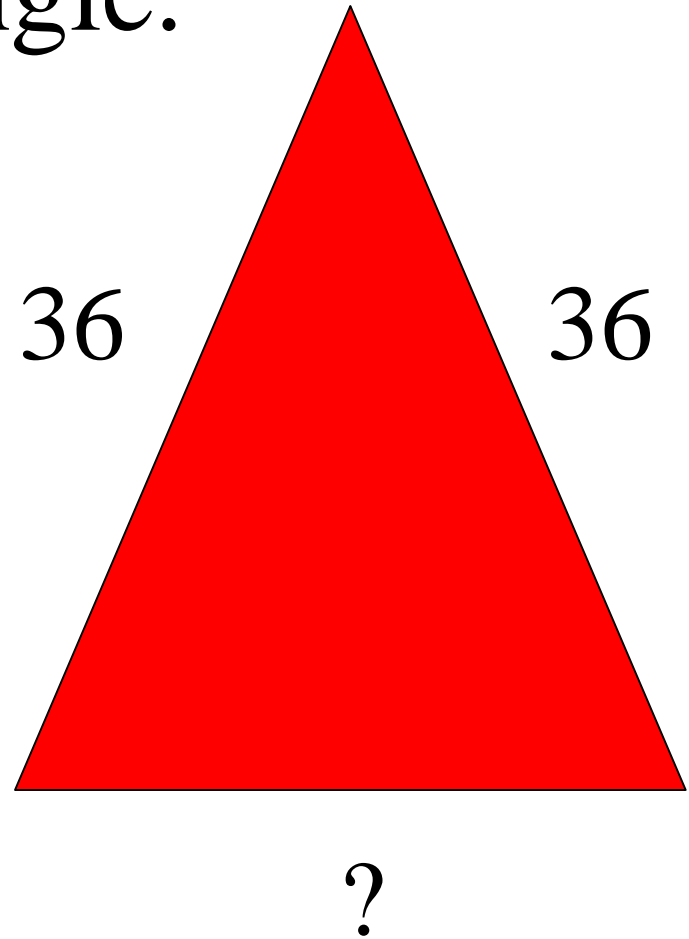
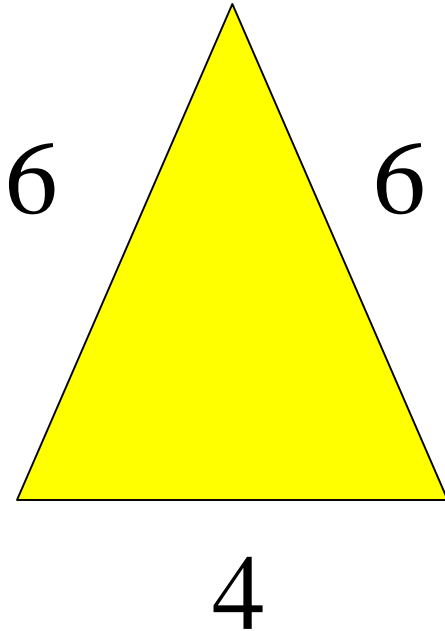
1) Determine the missing side of the triangle.



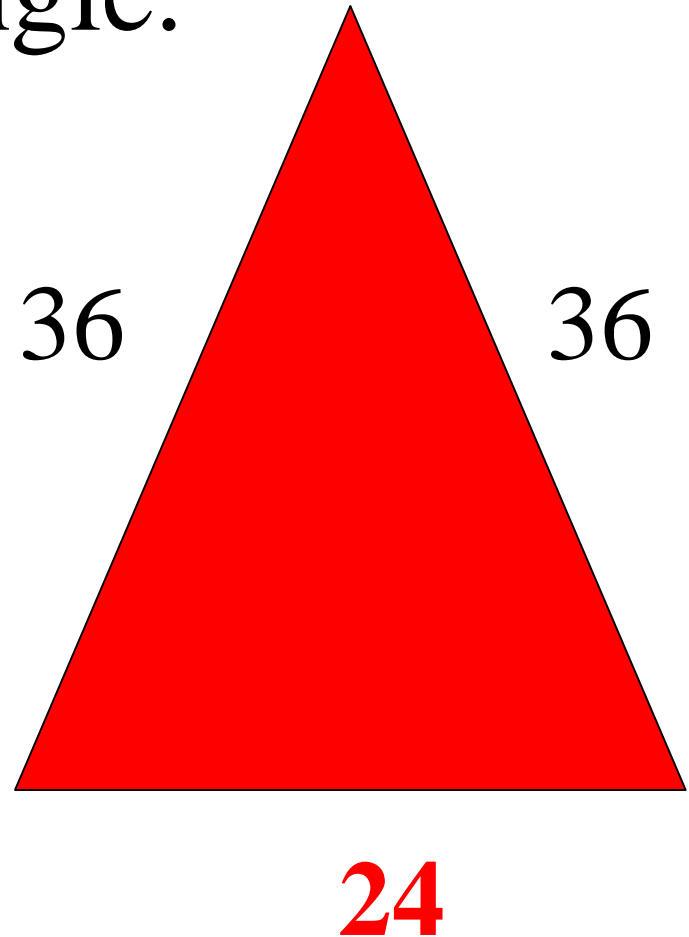
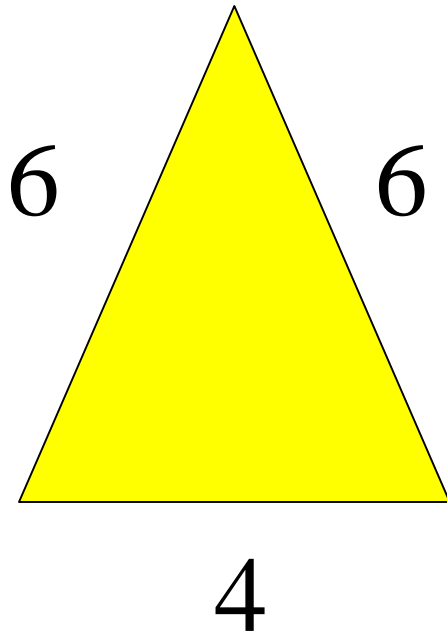
1) Determine the missing side of the triangle.



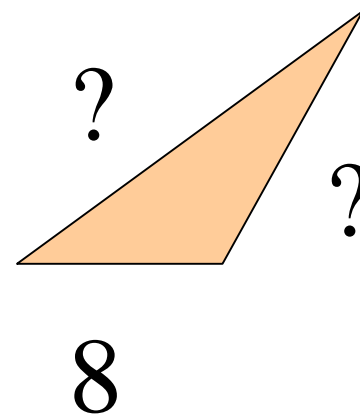
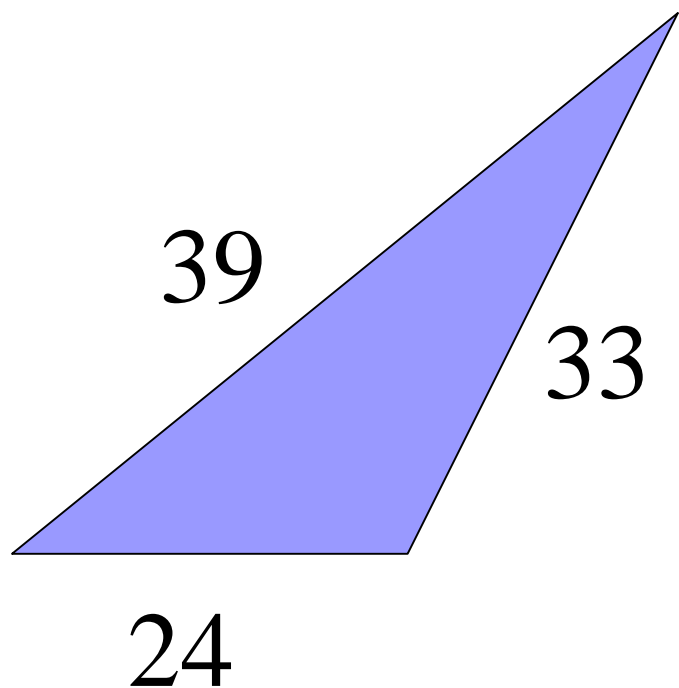
2) Determine the missing side of the triangle.



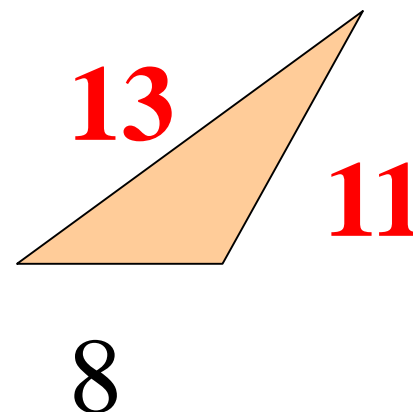
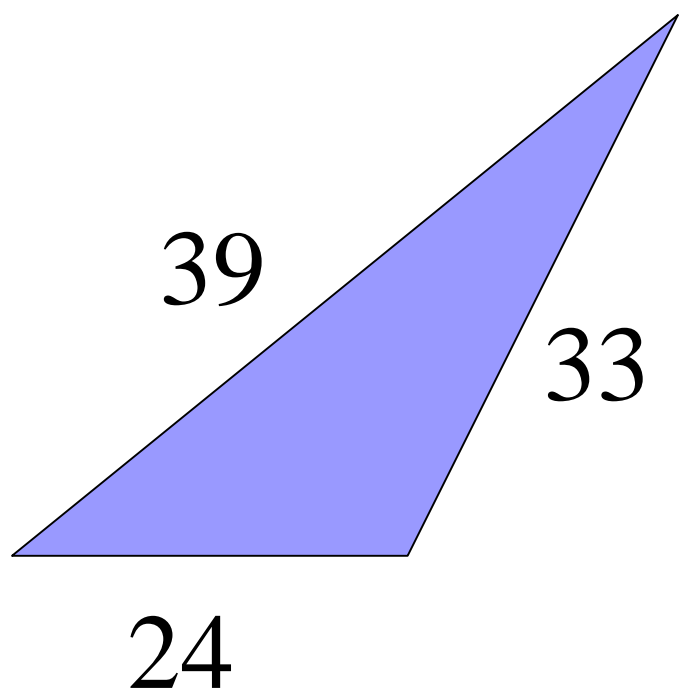
2) Determine the missing side of the triangle.



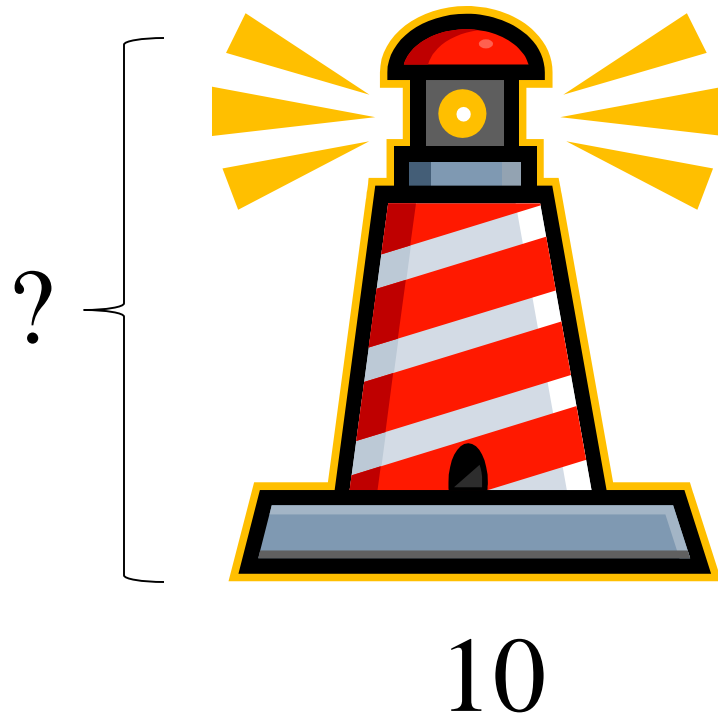
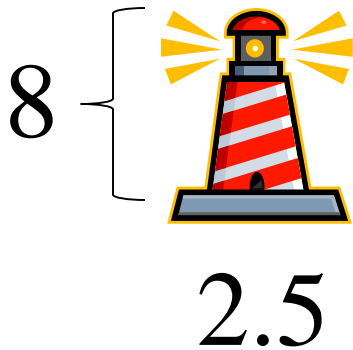
3) Determine the missing sides of the triangle.



3) Determine the missing sides of the triangle.

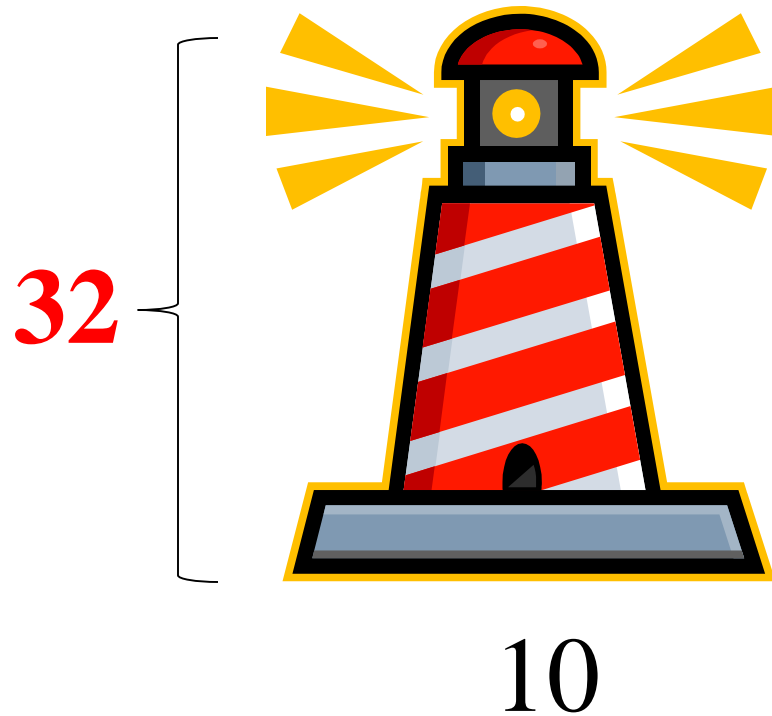
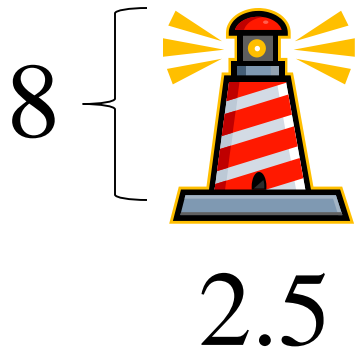


4) Determine the height of the lighthouse.

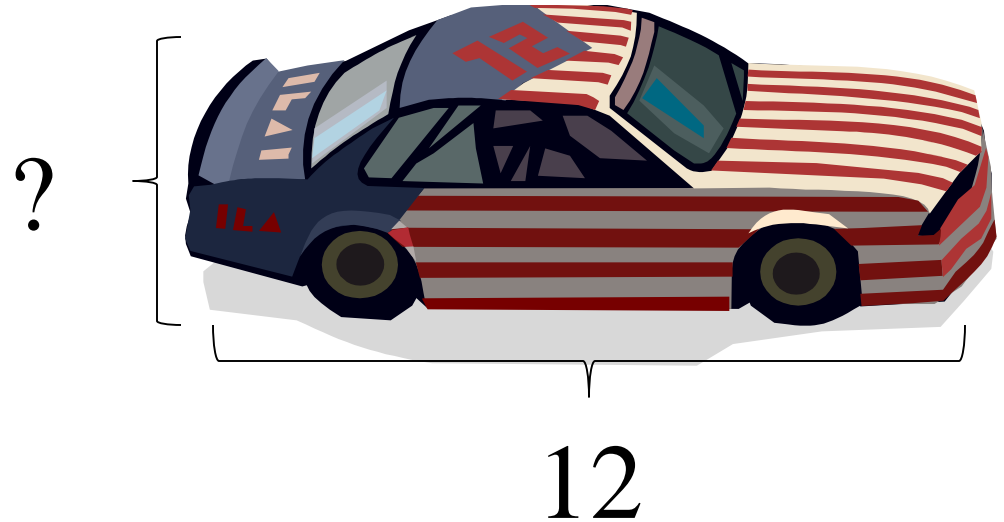
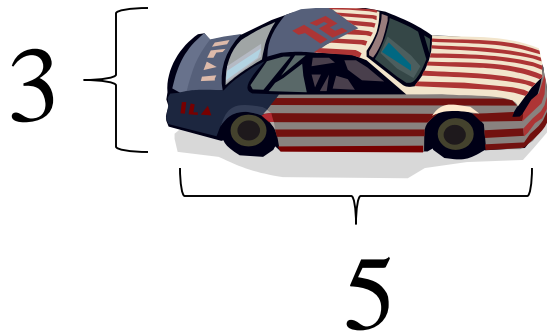




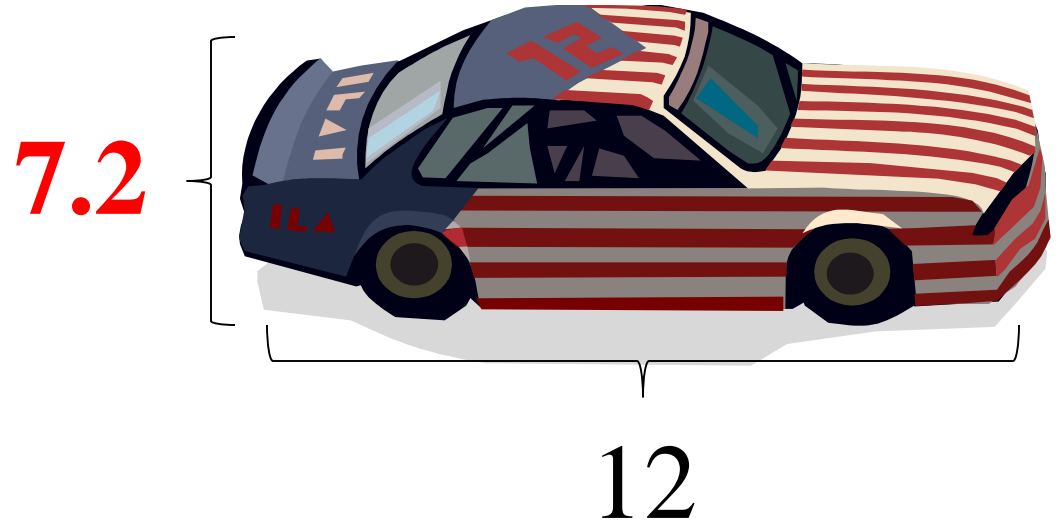
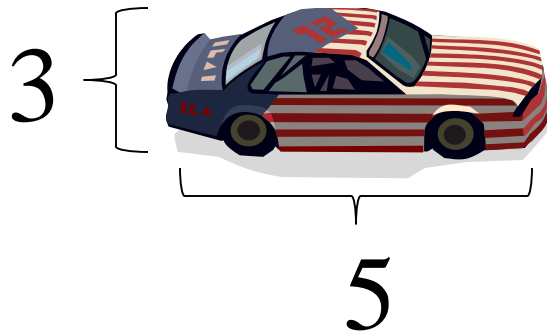
4) Determine the height of the lighthouse.



5) Determine the height of the car.



5) Determine the height of the car.



# THE END!

