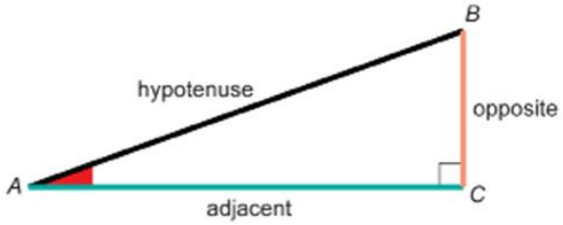
Trigonometric Scale



$$\sin\theta = \frac{opposite}{hypotenuse} \qquad \cos\theta = \frac{adjacent}{hypotenuse} \qquad \tan\theta = \frac{opposite}{adjacent}$$

Draw 2 right triangles with a reference angle of 15°. Make one LARGE and one small.			
LARGE TRIANGLE			
small triangle			
Draw 2 right triangles with a reference angle of 35°. Make one LARGE and one small.			
LARGE TRIANGLE			
small triangle			
Draw 2 right triangles with a reference angle of 45°. Make one LARGE and one small.			
LARGE TRIANGLE			
small triangle			
Draw 2 right triangles with a reference angle of 60°. Make one LARGE and one small.			
LARGE TRIANGLE			
small triangle			
Draw 2 right triangles with a reference angle of 80°. Make one LARGE and one small.			
LARGE TRIANGLE			
small triangle			

Reflection

1. When you made your triangles bigger or smaller, did the sine, cosine, and tangent values change? What did you notice about the numbers when the size changed?

2. What does this tell you about how the trigonometric ratios are connected to the angle? Do the ratios depend on the angle or on the size of the triangle?

3. Why do both the big and small triangles for the same angle give almost the same results? What's going on with the sides of those triangles that makes this happen?

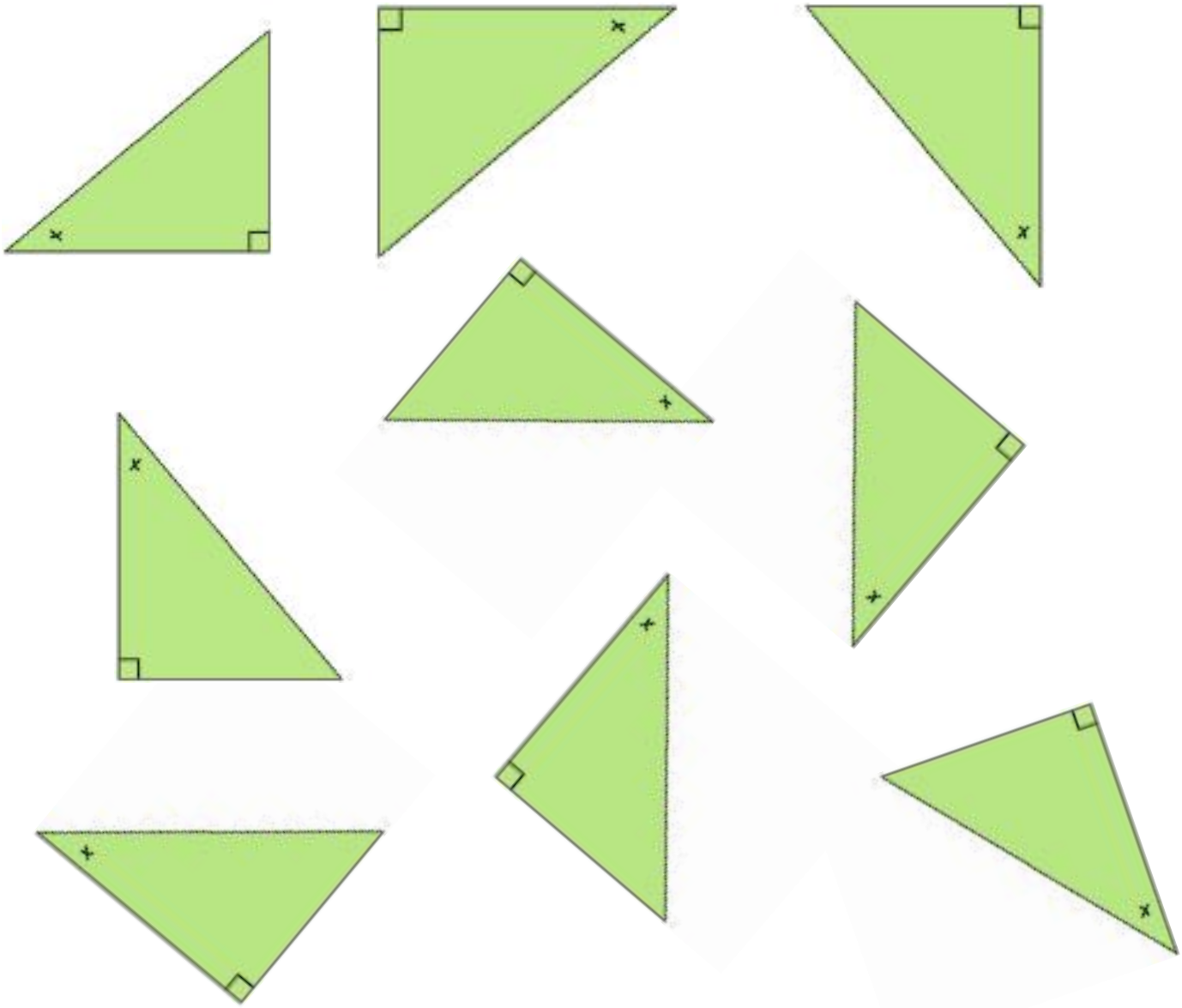
4. What do you think is the main reason the ratios stay the same even though the triangles are different sizes? Try to explain it in your own words.

5. Can you think of a real-life situation where it's helpful that these ratios don't change with size? For example, how might builders, pilots, or surveyors use this idea?

6. Which part of this activity helped you best understand what a ratio actually means? What made the idea of a ratio click for you?

The Reference Angle

Identify the opposite and adjacent sides in the following triangles if x is the reference angle.



Is the adjacent side always the bottom side? Which side is it?

Why do you think *x* called the reference angle?

Trigonometric Ratios

1. Circle the Reference Angle.
2. Label all three sides of the triangle: Opposite, Hypotenuse, Adjacent
3. Provide the three trigonometric ratios:

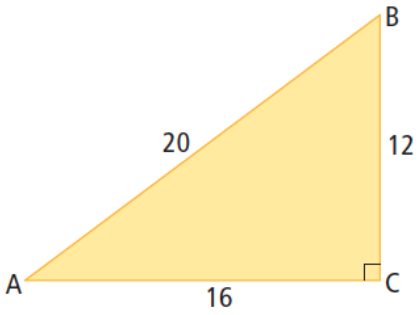
$$\sin\theta = \frac{opposite}{hypotenuse} \qquad \cos\theta = \frac{adjacent}{hypotenuse} \qquad \tan\theta = \frac{opposite}{adjacent}$$

CALCULATE each trigonometric ratio.

sin B

cos B

tan B

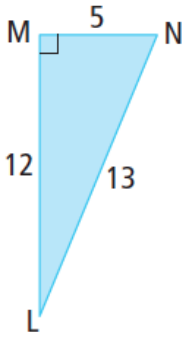


CALCULATE each trigonometric ratio.

sin N

cos N

tan N

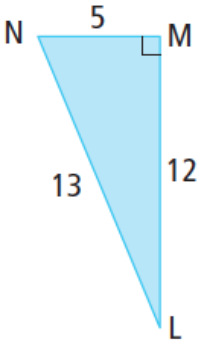


CALCULATE each trigonometric ratio.

sin L

cos L

tan L

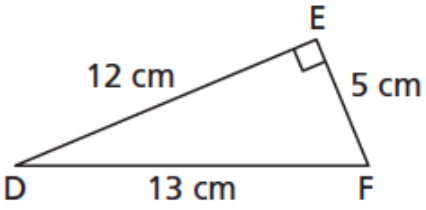


CALCULATE each trigonometric ratio.

sin D

cos D

tan D

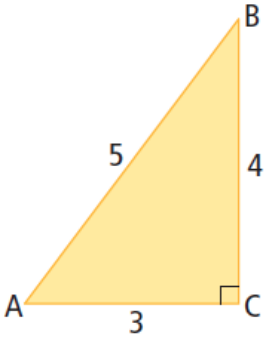


CALCULATE each trigonometric ratio.

sin A

cos A

tan A



CALCULATE each trigonometric ratio.

sin D

cos D

tan D