# Trigonometry Triangles
by Victor Chie

1. Place the names of the six trigonometric functions in the order in which we learned them (sin x, cos x, tan x, cot x, sec x, and csc x) at the vertices labeled A, B, C, D, E, and F, respectively.

2. Shade or color in the triangle with vertices A, B, and the center. Then shade in the triangle whose vertices are at D, F, and the center, and the triangle whose vertices are at C, E, and the center.
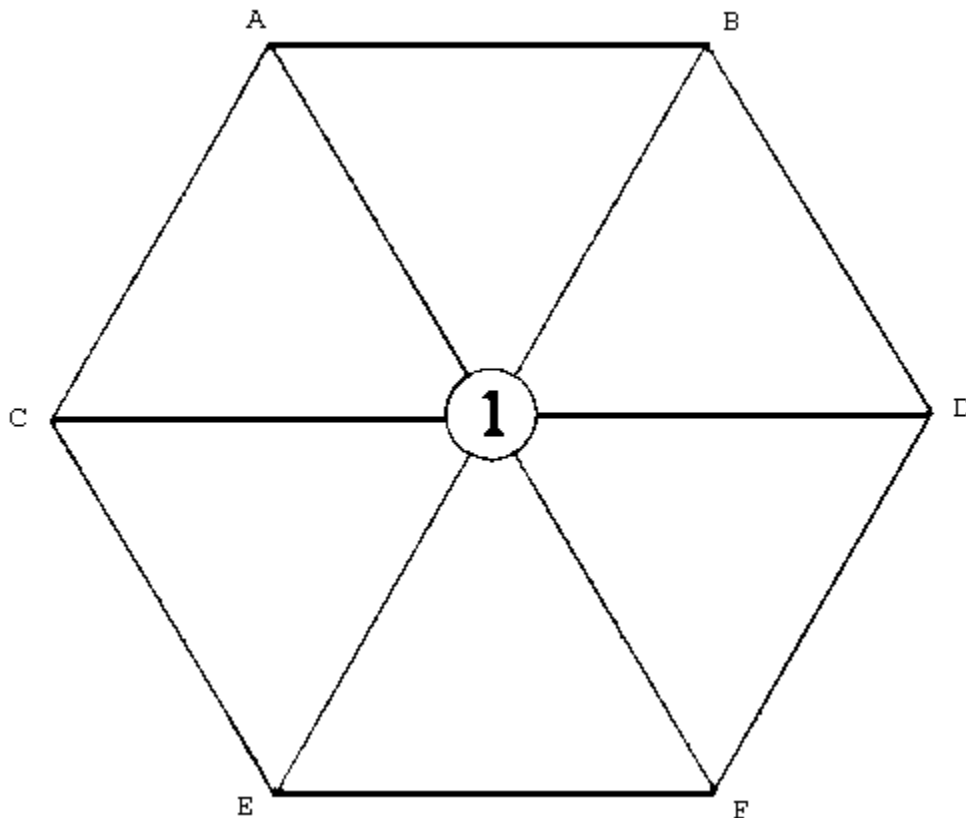
1. Cofunction Relations.
   The trig functions cosine, cotangent, and cosecant on
   the right of the hexagon are cofunctions of sine, tangent,
   and secant on the left, respectively.

2. Reciprocal Identities.
   The two trig functions on any diagonal are reciprocals
   of each other. Write the six identities below:

   _____   _____

   _____   _____

   _____   _____

3. Product Identities.
   Along the outside edges of the hexagon, any trig
   function equals the product of the functions on the
   adjacent vertices. Write these six identities below:

   <u>sin u = (cos u) (tan u)</u>   _____

   _____   _____

   _____   _____

4. Pythagorean Identities.
   For each shaded triangle, the upper-left function
   squared plus the upper-right function squared equals the
   bottom function squared. Write these three identities below:

   _____

   _____

   _____

5. Examples of how the hexagon can be used to solve trig problems:

A. Given sin u = 3/5 and tan u = -3/4, find the values of the other six trig functions.

STEP 1: Write the given values of the trig function at the appropriate vertices for sine and tangent.

STEP 2: Find csu u and cot u by reciprocal relations.

STEP 3: Find cos u by product relation.

STEP 4: Find sec u by reciprocal relation.

Write down your answers for the four trig functions above, and draw a triangle to verify your answers.

B. Given cot u = -8/15 and sec u > 0, find the values of all trigonometric functions.

STEP 1: Write -8/15 at the vertex corresponding to cot u. Note u is a 4th quadrant angle.

STEP 2: Find tan u by reciprocal relation.

STEP 3: Find sec u from the shaded triangle.

STEP 4: Find cos u by the reciprocal relation.

STEP 5: Find sin u by product relation.

STEP 6: Find csc u by reciprocal relation.