

Example: Sine, Cosine and Tangent of 60° and 45°**Problem:**

Using Special Right Triangles, find the sine, cosine and tangent of 60 degrees and 45 degrees.

Solution:

Recall the 30-60-90 Special Right Triangle. The shorter leg has length 1. The longer leg has length square root of 3. The hypotenuse has length 2.

The side opposite 60 degrees is square root of 3.

The side adjacent 60 degrees is 1.

And the hypotenuse is 2.

Now we can fill in the values for sine, cosine and tangent.

The sine of 60 degrees is equal to the opposite side over the hypotenuse, which equals square root of 3 over 2.

The cosine of 60 degrees is equal to the adjacent side over the hypotenuse, which equals 1 over 2.

The tangent of 60 degrees is equal to the opposite side over the adjacent side, which equals square root of 3 over 1 or just square root of 3.

Recall the 45-45-90 Special Right Triangle. The legs both have length 1. The hypotenuse has length square root of 2.

The side opposite 45 degrees is 1.

The side adjacent 45 degrees is also 1.

And the hypotenuse is square root of 2.

Now we can fill in the values for sine, cosine and tangent.

The sine of 45 degrees is equal to the opposite side over the hypotenuse, which equals 1 over the square root of 2. We should not leave a radical on the bottom, so we multiply by the square root of 2 on the top and the bottom to give a final fraction of the square root of 2 over 2.

The cosine of 45 degrees is equal to the adjacent side over the hypotenuse, which equals 1 over the square root of 2. We should not leave a radical on the bottom, so we multiply by the square root of 2 on the top and the bottom to give a final fraction of the square root of two over 2.

The tangent of 45 degrees is equal to the opposite side over the adjacent side, which equals 1 over 1 or, simplified, equals 1.