Algebra 2
Unit: Geometry
Section: Geometry of a Triangle

Example: Similar Triangles

Problem:

Shown below are similar triangles ABC and ADE and information about the side lengths and angle measures. Find the values of x and y. AC equals two x minus 1. AB equals 8. AE equals 6. AD equals 12. The measure of angle A equals 40 degrees. The measure of angle C equals 60 degrees. The measure of angle D equals four y plus 40 degrees.

Solution:

When working with similar figures, it is always helpful to draw the figures so they are oriented the same way, with corresponding sides in the same location. In this case, redraw triangle ABC and triangle ADE separately and label each part given.

By drawing the two figures oriented the same way, it is easy to see which parts correspond with which parts.

Let's first start with the side lengths. Keep in mind that these are similar triangles, so we must set up proportions.

The ratio of side AC to side AE is equal to the ratio of side AB to side AD.

Using the information given in the problem, we can write the equation: 2x minus 1 divided by 10 equals 8 divided by 12.

Cross multiply being very careful to multiply all terms, to get the equation 24 x minus 12 equals 80.

Solve this equation. The result is x equals three and five-sixths, which is approximately equal to 3 point eight three three.

Now, let's look at the angle measures. Unlike the side lengths, the angle measures of corresponding angles are EQUAL. Looking at the similar triangles, we see that angle B corresponds to angle D. This means that angle B also equals four y plus 40.

We can write the equation: sixty plus forty plus four y plus forty equals 180.

Solve this to get y equals ten.

When working with similar figures, it is important to remember that the corresponding side lengths are in proportion, but the corresponding angles are EQUAL.