

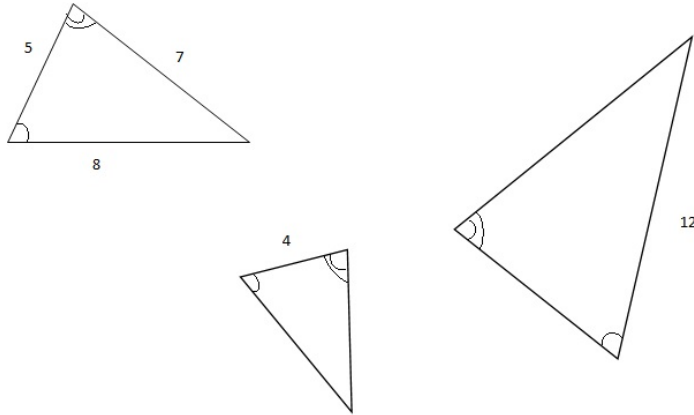
## Triangle Geometry

Three things you have to remember about triangles:

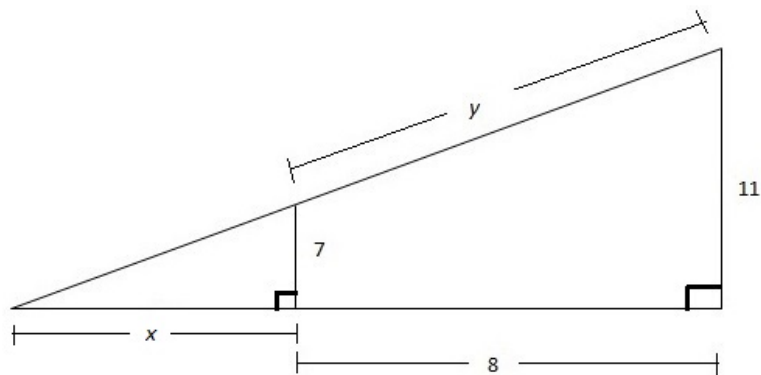
1. **The area of a triangle** is  $\frac{1}{2} \times \text{base} \times \text{height}$ . The height should be drawn to that base. So potentially there are 3 ways you can compute the area of a triangle, using the 3 pairs of heights and bases.
2. **Pythagorean Theorem** for right triangles.
3. Ratios of corresponding sides for **similar triangles**.

Below are several problems. Most use similar triangles and the ideas or the pictures will appear in story problems throughout this course and Math 124/5.

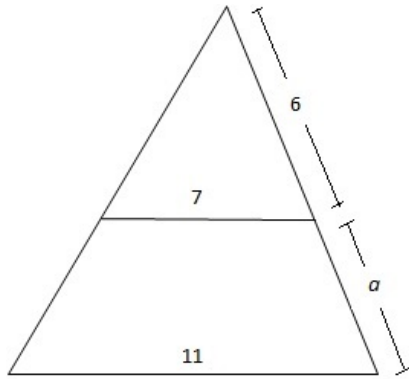
1. All three triangles below are similar with two of the matching angles marked. Find all missing sides.



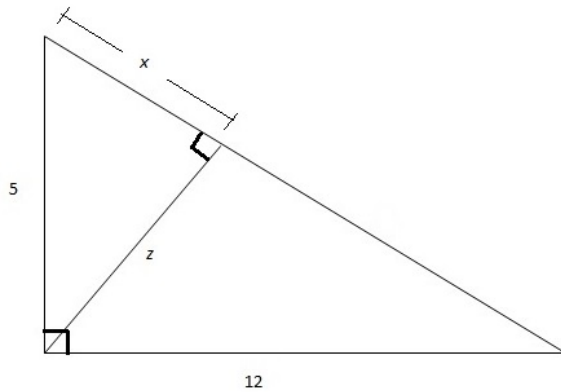
2. The two right angles are marked in the picture. Use similar triangles to find  $x$ . Then use the Pythagorean Theorem to find  $y$ .



3. The two edges with lengths 7 and 11 are parallel. Use similar triangles to find  $a$ .

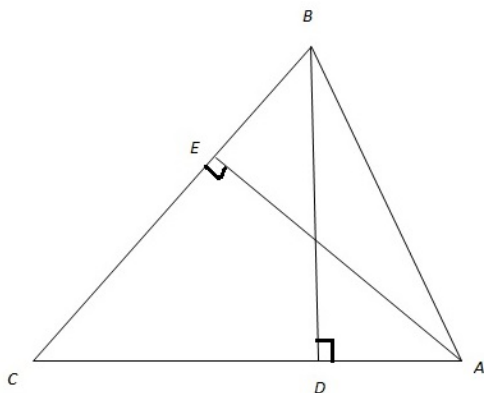


4. The two right angles are marked in the picture.

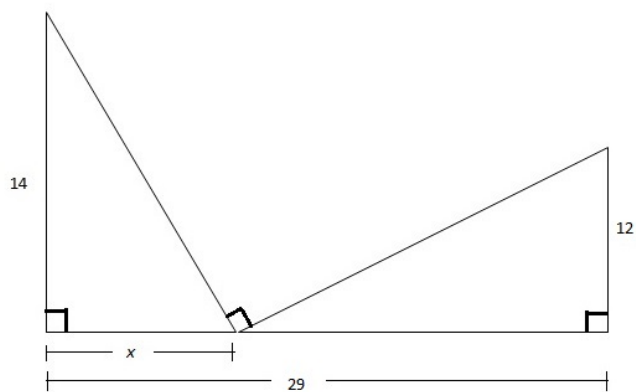


- Find the hypotenuse of the big triangle.
- Find  $x$  using similar triangles.
- Find  $z$  by computing the area of the big triangle in two ways.
- Check that your values for  $x$  and  $z$  and 5 satisfy the Pythagorean Theorem.

5. The right angles are marked. We know:  $CD = 12$ ,  $DA = 13$ ,  $BD = 9$ . Find  $EA$  using the area of the triangle.



6. The right angles are marked. Find  $x$  and the other three missing lengths in the picture.



7. Find an expression for the sum of the hypotenuses in terms of  $x$ . This time the third angle is not necessarily a right angle.

