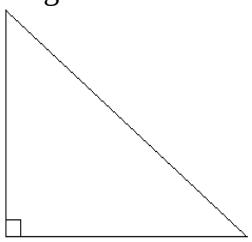
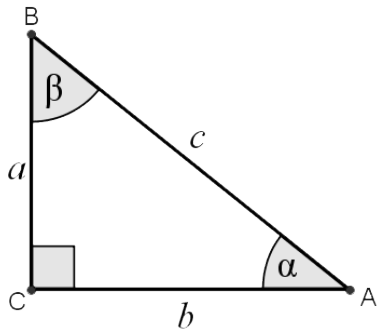
Parts of a Right Triangle and the Pythagorean Theorem

- **Right Triangle -** Triangle with one right angle.
  - **right-angled triangle** (British English) is a triangle in which one angle is a right angle (that is, a 90-degree angle). The relation between the sides and angles of a right triangle is the basis for trigonometry.



- The angles of a right triangle are named using uppercase letters, with **C** usually used for the right angle and **A** and **B** for the other acute angles.
- Angles are also labeled with greek like **α, θ,** and **β,** while sides are labeled with lower case letters like a, b and c.
- The longest side that is opposite the right angle is the **hypotenuse** and the sides, are also called **legs** , are referred to as **adjacent** and **opposite sides** .

- The Right Triangle ABC in the figure has the following parts :



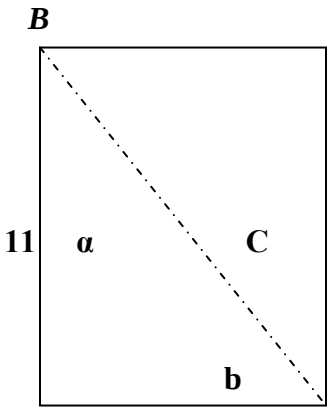
- Angles A, B, and C with C as the right angle. Angles A and B can also be named ∠ **α** and ∠ **β**, respectively .
- Side BA or side C is the **HYPOTENUSE.**
- Side CA is the side adjacent to angle **α.**
- **S**ide BC is the side opposite angle **α.**

- The **Pythagorean Theorem** – relates the three sides of a right triangle.
  - This theorem states that" **the sum of the squares of two legs of a right triangle is equal to the square of the hypotenuse"** or $\mathbf{c^{2=}\ a^2 + b^2}$
- Where c is the hypotenuse and a and b are the legs.

- Given the measures of two sides of a right triangle , you can find the measure of the third side by applying the **Pythagorean Theorem**

EXAMPLE:

SOLVING FOR THE SIDE OF A RIGHT TRIANGLE USUNG THE PYTHAGOREAN THEOREM



- *The dimension of a letter – sized bond paper is 8.5 inches by 11 inches 9 see figure)solve for the length of the diagonal using the Pythagorean Theorem .*

GIVEN:

a= 11 b = 8.5 C= ?

SOLUTION : Figure shows that the diagonal c forms two right triangles.

With c as the hypotenuse. To find the length of c, use the

PYTHAGOREAN THEOREM $\mathbf{c^{2=}\ a^2 + b^2}$

SOLVING:

$$\mathbf{c^{2=}\ a^2 + b^2}$$

$$\boldsymbol{c = \sqrt{11^2 + 8.5^2}}$$

$$\boldsymbol{c = \sqrt{121 + 72.25}}$$

$$\boldsymbol{c = \sqrt{193.25}}$$

c=13.9

- **Thus, the length of the diagonal is approximately 13.9 inches .**