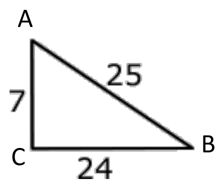
“Fixing” Pythagoras

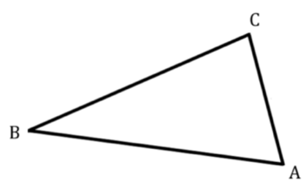
Name:___________________________

You know by now that triangles come in all shapes and sizes and can be classified by their sides and angles. In Geometry and Trigonometry, we focus on right triangles, and discover many cool properties. But what about acute or obtuse triangles? What properties still hold? Which ones need to be adjusted or tweaked?

1. Without a protractor, how could you prove that the triangle below is a right triangle?

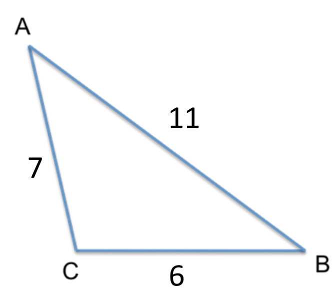


2. Is the triangle below a right triangle? Give a reason to support your guess.



3. Your teacher will now give you some additional information about the triangle. Is this enough information to determine if the triangle is acute, right, or obtuse? Explain.

4. Let’s look at a different triangle.



   a) Without doing any calculations, decide if c^2 will be greater than, less than, or equal to $a^2 + b^2$. Give a reason for your answer.

   b) Now actually do the calculation. By how much are we off?

5. Suppose you measured that $m\angle C = 115.4^\circ$. Calculate $2(a)(b)(\cos C)$. What do you notice?

6. Now calculate $2(a)(b)(\cos C)$ for the triangle in question 1. Why does this make sense?

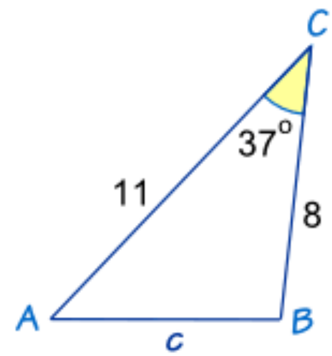
7. Based on all your noticings above, can you come up with a relationship between the three sides of a triangle that would work for *any* triangle?

Section 5.2—Law of Cosines

Important Ideas:

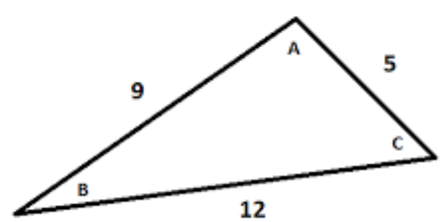
Check Your Understanding!

1. Three popular Italian restaurants (Adagio, Buongustaio, and Crepuscolo's) are located in Chicago as shown on the map. Distances are measured in miles.
   a. Find the distance between Adagio and Buongustaio.



   b. Find the measures of the angles created at Adagio and Buongustaio.

2. Adele, Beyonce, and Cher live within 15 miles of each other, as shown on the map.
   a. Find the angle created at Adele's house when she views Beyonce's house and Cher's house.



   b. Find the measures of the other two angles.

3. Use the Law of Cosines to explain why in an acute triangle $c^2 < a^2 + b^2$, but in an obtuse triangle $c^2 > a^2 + b^2$.