PreCalculus Name: Period: Date:

Warm Up 2/10

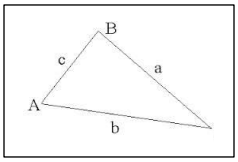
Lesson 6-5: The Law of Cosines

Objectives

Students will…
- Be able to know what Law of Cosines is.
- Be able to apply the Law of Cosines to solve for missing sides or angles.

Triangles

We've been studying the trigonometric ratios involving right triangles. Trigonometry can also be used for **non**-right triangles. First thing we need to do is to be consistent with our notations.

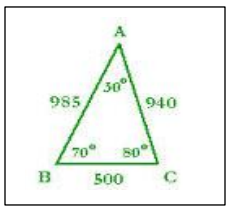


Consider the triangle ΔABC shown on the right. The uppercase letters $A,\ B,\ C$ represent the _____, or the _____ of the triangle, while the lower case letters $a,\ b,\ c$ represent the sides.
For ease, the angles will always be labeled by uppercase letters, while the side _____ to each angle will always be labeled with the lowercase letter of the opposite angle.
So, from our picture, we see that a is the side opposite to A, while b is the side opposite to B and c is the side opposite to C.

Law of Cosines

There exists another important law regarding triangles (not just right triangles).
Law of Cosines- In any triangle, say, ΔABC, we have:

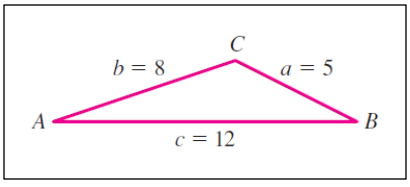
Ex.



For the ΔABC to the left, we have…

Example

So we can apply the Law of Sines to solve for missing sides or angles.
(Important: Make sure your calculator is in the right mode!)
Find the angles of the triangle.



PreCalculus Name: Period: Date:

Example

Solve ΔABC, where $\angle A = 46.5°$, $b = 10.5$, and $c = 18$

Heron's (Area) Formula

An interesting application of the Law of Cosines involves a formula for finding the _____ of a triangle from the lengths of its three sides. We won't derive the formula here for time's sake. (see textbook)

Heron's Formula- For ΔABC the area $\mathcal{A} =$ _____**,** where $s =$ _____, which is the _____ (half perimeter).

Ex. Find the area of a triangle with give side lengths:
$a = 280$, $b = 125$, and $c = 315$

Homework 2/10
TB pg. 513 #1, 3, 5, 8, 11-17 (odd), 27, 29