

Math 1613 - Trigonometry

Quiz #21 - 2011.11.01

Solutions

1. Why do we need the Law of Cosines when we have the Law of Sines?

We need the Law of Cosines to solve the SAS and SSS case triangles.

2. Given triangle $\triangle abc$, with $c = \sqrt{2}$, $A = 60^\circ$ and $B = 75^\circ$, find the remaining unknowns a , b and C .

First, $C = 180^\circ - (60^\circ + 75^\circ) = 45^\circ$. Now we can use the Law of Sines on the remaining side lengths a and b . Solving for a first gives:

$$\frac{\sqrt{2}}{\sin(45^\circ)} = \frac{a}{\sin(60^\circ)}$$

this gives $a = \sqrt{2} \frac{\sin(60^\circ)}{\sin(45^\circ)} = \sqrt{3}$.

Similarly,

$$\frac{\sqrt{2}}{\sin(45^\circ)} = \frac{b}{\sin(75^\circ)}$$

which gives $b = \sqrt{2} \frac{\sin(75^\circ)}{\sin(45^\circ)} = \sqrt{2} \frac{1 + \sqrt{3}}{2}$.