Pre-Calculus, Unit 2A Lesson 3
Inverse Trig Functions and the Law of Sines

WIMD: What I must do:
• I will evaluate inverse trig functions to solve right triangles
• I will use the Law of Sines to solve triangles
• Find the area of a triangle given SAS or AAS

Key Words: arcsin arccos arctan

Inverse Trig Functions
(Solve the equation)

Decrement, radian and which quadrant. Oh my?

If \( r = 14 \) and \( s = 8 \), find \( S \).

Mar 20-12:29 AM

Inverse Trig Functions
(Solve the equation)

Decrement, radian and which quadrant. Oh my?

Mar 20-12:33 AM

Inverse Trig Functions
(Household)

The camera for a baby monitor is set up on a shelf in a child’s room, and it is angled so that it captures the image of the center of the baby’s crib. The shelf is about 3 feet higher than the crib, and its horizontal distance from the crib is about 7 feet. What is the angle of depression of the light?

The angle of depression from the monitor and the angle of elevation to the monitor are equal in measure. To find the angle of elevation, use the tangent function.

\( \tan^{-1}(\frac{3}{7}) = 23.2^\circ \)

Mar 20-12:38 AM

Inverse Trig Functions
(Solve each triangle described, given the triangle at the right.)

Mar 20-12:41 AM
Solve each triangle described, given the triangle at the right.

\[ b = 18, \ c = 52 \]

\[ a = \approx \]

\[ m\angle A = \approx \text{deg} \]

\[ m\angle B = \approx \]

I will use the Law of Sines to solve triangles

5.6 Trigonometry
Law of Sines (2.02)

What about a non-right triangle?

Divide the triangle into two right triangles.

\[ h = c \sin A \]

\[ h = a \sin C \]

\[ \therefore c \sin A = a \sin C \]

\[ \Rightarrow \frac{\sin A}{a} = \frac{\sin C}{c} \]

How about the area of a triangle, \( K \)?

\[ K = \frac{1}{2} \cdot bh \]

\[ h = c \sin A \]

by substituting for \( h \)...

\[ \therefore K = \frac{1}{2} \cdot bc \sin A \]

This works if you know two sides and the INCLUDED angle.
Areas of a triangle (two sides and the INCLUDED angle.)

\[ K = \frac{1}{2} bc \sin A \]
\[ K = \frac{1}{2} ac \sin B \]
\[ K = \frac{1}{2} ab \sin C \]

Area of a triangle if you know two angles and one side...

\[ K = \frac{1}{2} b \sin A \cdot \frac{c \sin B}{\sin C} \]

Also,
\[ \sin B = \sin C \]

or
\[ b = \frac{c \sin B}{\sin C} \]

by substitution

\[ K = \frac{1}{2} c \sin A \sin B \]

Notes

\[ K = \frac{1}{2} a^2 \frac{\sin B \sin C}{\sin A} \]

\[ K = \frac{1}{2} b^2 \frac{\sin A \sin C}{\sin B} \]