## WELCOME



Folsom High

## Warm-Up

1) Write the ratio for $\sin , \cos$ and $\tan$ of angle $F$


## Learning Target

## Find the area of a triangle using Sine.

## Solve word problems using trig.

## Chapter 8 Section 4 Part 1 Area \& Word Problems

## Soh - Cah - Toa <br> 

# Area of a $\Delta$ Given 2 sides and $\angle$ Between 

 With trig. we can derive the equation for the area of $\Delta s$(Must know 2 sides and angle between)


## Find the Area



Word Problems

## New Vocabulary

## Angle of Elevation:

The angle made at a point by a horizontal line and an increasing slope.

## Angle of Depression:

The angle made at a point by a horizontal line and a decreasing slope.

Joe is building a deck off the side of his house and wants the put in a ramp. He knows the deck is 1 ft high and that he wants the ramp to start 5 ft away from the deck. What will the angle of elevation be from the ground?

A surveyor is looking up at the top of a building that is 140 meters tall. His eye level is 1.4 meters above the ground, and he is standing 190 meters from the building. Calculate the measure of the angle from his eyes to the top of the building.


# A Field Goal kicker kicks the ball at a $30^{\circ}$ angle and it travels 

 through the air in a straight line until it goes through the Goal post 11 yards up in the air.How many yards ( $x$ ) was the ball in the air? How far (y) from the goal post was the kicker?

To measure the width of the Grand Canyon, a surveyor stands at a point on the North Rim of the canyon and measures the angle of depression to be at 19 degrees.

At the surveyor's position on the North Rim, the Grand Canyon is 7,256 feet above sea level. The point on the South Rim, directly across, is 6,159 feet above sea level. Sketch a diagram of the situation and determine the width of the Grand Canyon at the surveyor's position.


Collin is attempting a trick shot where he stands on a 20 ft building and throws a ping pong ball into a cup. If he can throw the ball at a $28^{\circ}$ angle of depression how far from the base of the building should he place the cup. (Assume no wind)

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## Chapter 8 Section 4 part 2 Trig Laws

## Learning Target

## Use the Law of Sines or

 Law of Cosines to find missing sides and/or missing angles in any triangle.
## Warm-Up

1) Find the area of the triangle:

2) Find the length of side $x$ :


## Law of Sines

Given, (2 sides and a $\angle$ opposite) or ( $2 \angle$ s and a side)...

## any triangle ABC,

$\frac{\sin A}{a}=\frac{\sin B}{b}=\frac{\sin C}{c}$

## Try it

For any triangle $A B C$, $\frac{\sin A}{a}=\frac{\sin B}{b}=\frac{\sin C}{c}$

Find $\angle B$


## Law of Cosines

Given, ( 2 sides and a $\angle$ between) or (any 3 sides)...
For any triangle $A B C$,
$a^{2}=b^{2}+c^{2}-2 b c \cdot \cos A$
$b^{2}=a^{2}+c^{2}-2 a c \cdot \cos B$
$c^{2}=a^{2}+b^{2}-2 a b \cdot \cos C$


## Try it

For any triangle $A B C$,
$a^{2}=b^{2}+c^{2}-2 b c \cdot \cos A$
$b^{2}=a^{2}+c^{2}-2 a c \cdot \cos B$
$c^{2}=a^{2}+b^{2}-2 a b \cdot \cos C$

Find side $A B$


