Law of Sine**s:** $ \frac{sin⁡(A)}{a}=\frac{sin⁡(B)}{b}=\frac{sin⁡(C)}{c}$

The Law of Sines is important because it can help us solve problems involving right and non-right triangles.

The height breaks triangle ABC into two right triangles. Using SohCahToa, find the following:

**Sin(A)= Sin(C)=**

Next, solve the equations for h.

**h= h=**

Since both of the previous equations are equal to h, we can set them equal to each other.

Finally, divide both sides by a and c. What do you get?

B

c

a

h

b

A

C

**When to use the Law of Sines:**

Solving an **SAA** triangle, solving a **ASA** triangle, and the ambiguous case (**SSA**)

 \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_

7

60°░

5

6

55°░

50°░

35°░

35°░

8

**Example #2. SAA**

**Example #1. SAA**

<C=30°

<C=82°

a

b

a

b

<B=\_\_\_\_\_

<A=64°

c=14

<A=46°

<B=\_\_\_\_\_

c=56 inc

Step #1: Find the measure of the missing angle

Step #2 Use Law of Sines to find missing sides

<C=22.5°

**Example #4: ASA**

<C=33.5°

**Example #3: ASA**

b=12

b=76

a

a

<B=\_\_\_\_\_

c

<A=40°

c

<A=50°

<B=\_\_\_\_\_

Law of Cosines**:** $c^{2}=a^{2}+b^{2}-2ab\*cos(C)$

**The Law of Cosines is used to solve SSS and SAS triangles.**

**SAS**

**SSS**

**Example #1: SAS**

Step 1: Use the Law of Cosines to find the side opposite the given angle

C

Step 2: Use the Law of Sines to find the angle opposite the shortest side

a

b=20

B

c=30

<A=60°

Step 3: Find the measure of the third angle

C

**Example #2: SSS**

b=9

a=6

B

c=4

A



A

B

C

a

c

b

 **Let's say that <C=90°. What is cos(C)?**

 **Thus, if C=90° the Law of Cosines becomes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_**

 **If <C is less than 90°, is cos(c) positive or negative?**

 **Thus, if <C is less than 90°, is the length of c greater than or less the length if <C=90°?**

A

B

C

a

c

b

A

B

C

a

c

b

 **If <C is greater than 90°, is cos(c) positive or negative?**

 **Thus, if <C is greater than 90°, is the length of c greater than or less the length if <C=90°?**