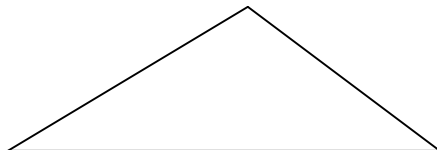


**Class Notes: 6.1 Law of Sines**      Name \_\_\_\_\_

The LAW of SINES... what is it's use? \_\_\_\_\_

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MEMORIZE: THE LAW OF SINES

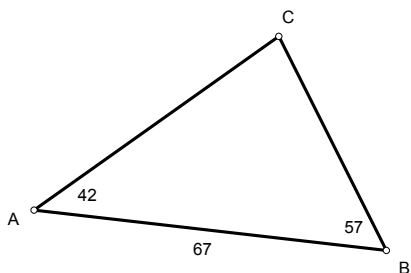
For ANY triangle  $ABC$ , where  $a$ ,  $b$ , and  $c$  are the lengths of the sides OPPOSITE the angles with

measures  $A$ ,  $B$ , and  $C$  (respectively)... 
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Examples: Solve  $\triangle ABC$ .

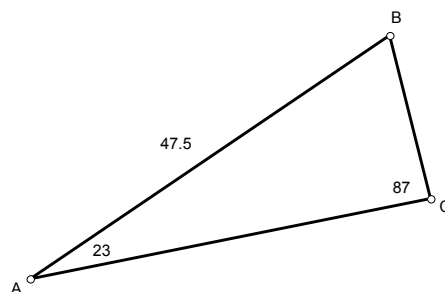
1.

Note: We are given **ASA** here



2.

Note: We are given **AAS** here

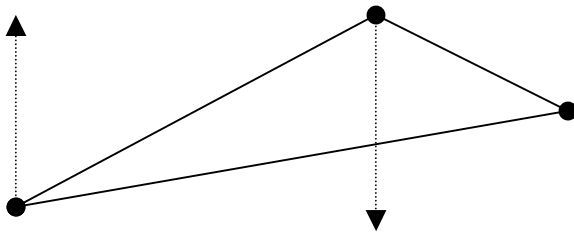


Example1: WORD PROBLEM.

A ship is moving in a straight line towards the Point Cove lighthouse. The measure of the angle of elevation from the bridge of the ship to the lighthouse beacon is  $25^\circ$ . Later, from a point 600 feet closer, the angle of elevation is  $47^\circ$ . To the nearest foot, how high is the beacon above the level of the bridge of the ship?

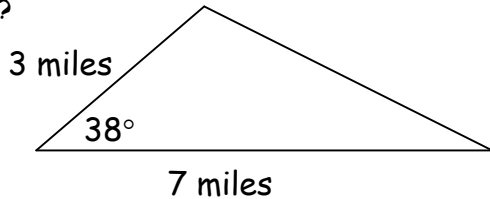
Example2: WORD PROBLEM.

The bearing from the pine Knob fire tower to the Colt Station fire tower is  $N 65^\circ E$ , and the two towers are 30 kilometers apart. A fire spotted by rangers in each tower has a bearing of  $N 80^\circ E$  from Pine Knob and  $S 65^\circ E$  from Colt Station. Find the distance of the fire from the Pine Knob tower.

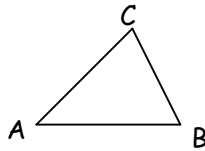


## 6.1 Area of a Triangle

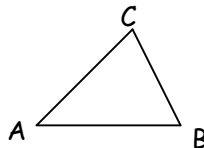
Given the following triangular piece of land, could you find the area of the piece from the given information?



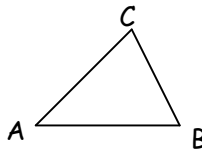
Could we derive a formula for finding the area of a triangle given **two sides and the included angle - SAS?**



$$K = \frac{1}{2} \sin$$



$$K = \frac{1}{2} \sin$$



$$K = \frac{1}{2} \sin$$

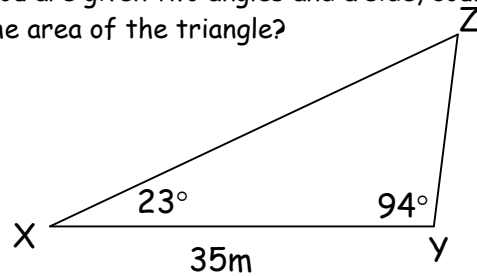
Generally, since not every triangle is labeled A,B,C you should simply remember that the **AREA** of a triangle =  $\frac{1}{2}$  the product of any \_\_\_\_\_ and the sine of \_\_\_\_\_.

### EXAMPLES:

1. Determine the area of  $\triangle DEF$  to the nearest square inch. **DRAW A PICTURE.**

$$\angle E = 49.6^\circ, d = 17.4, \text{ and } f = 19.7$$

2. If you are given two angles and a side, could you find the area of the triangle?



## Notes 6.2 Area of a Triangle

NOTE: we use this formula for finding the area of a triangle when we are given **SAS**

The area,  $K$  of triangle  $ABC$  is given by any one of these formulas:

$$K = \frac{1}{2}bc \sin A$$

$$K = \frac{1}{2}ac \sin B$$

$$K = \frac{1}{2}ab \sin C$$

AREA =

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-----We also have a formula for finding the area of a triangle given **SSS**

(The Greek mathematician Heron developed the formula - hence it is called **HERONS' AREA FORMULA**)

The area,  $K$  of triangle  $ABC$  is given by:

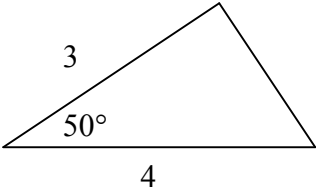
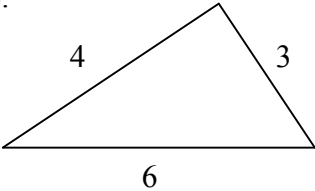
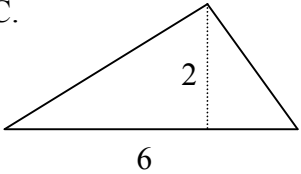
$$K = \sqrt{s(s-a)(s-b)(s-c)}, \text{ where } s = \frac{a+b+c}{2}. \text{ } s \text{ is called the semiperimeter of the triangle.}$$

Examples:

1. Determine the area of  $\triangle DEF$  to the nearest square inch.  $d = 15.2$ ,  $e = 22.7$ , and  $f = 8.9$

2. You want to buy a triangular lot measuring 1350 feet by 1860 feet by 2490 feet. The price of the land is \$2200 per acre. How much does the land cost? (1acre = 43,560 square feet)

3. Which formula would you use to find the area of the following triangles?

<p>A.</p> 	<p>B.</p> 
<p>C.</p> 	<p>D.</p> 