NAME _____ DATE _____ PERIOD _____

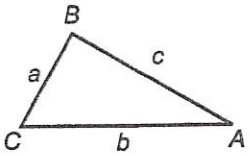
5-6

Study Guide

Key

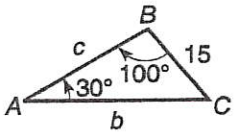
The Law of Sines

Given the measures of two angles and one side of a triangle, we can use the **Law of Sines** to find one unique solution for the triangle.



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

Example 1 **Solve $\triangle ABC$ if $A = 30°$, $B = 100°$, and $a = 15$.**



First find the measure of $\angle C$.
$C = 180° - (30° + 100°)$ or $50°$

Use the Law of Sines to find b and c.

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

$$\frac{15}{\sin 30°} = \frac{b}{\sin 100°} \qquad \frac{c}{\sin 50°} = \frac{15}{\sin 30°}$$

$$\frac{15 \sin 100°}{\sin 30°} = b \qquad c = \frac{15 \sin 50°}{\sin 30°}$$

$$29.54423259 \approx b \qquad c \approx 22.98133329$$

Therefore, $C = 50°$, $b \approx 29.5$, and $c \approx 23.0$.

The area of any triangle can be expressed in terms of two sides of a triangle and the measure of the included angle.

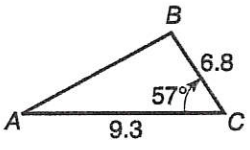
Area (K) of a Triangle	$K = \frac{1}{2}bc \sin A$	$K = \frac{1}{2}ac \sin B$	$K = \frac{1}{2}ab \sin C$

Example 2 **Find the area of $\triangle ABC$ if $a = 6.8$, $b = 9.3$, and $C = 57°$.**

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

$K = \frac{1}{2}(6.8)(9.3) \sin 57°$

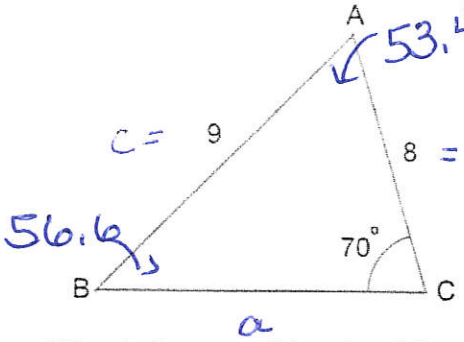
$K \approx 26.51876336$



The area of $\triangle ABC$ is about 26.5 square units.

PC Unit 8 Lesson 1 Area of a Triangle Practice 1A

Name: _____



What is the area of the triangle?

Give your answer in square units correct to 1 decimal place.

(28.9 square units)

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

$K = \frac{1}{2}(8)(9)\sin 53.4$

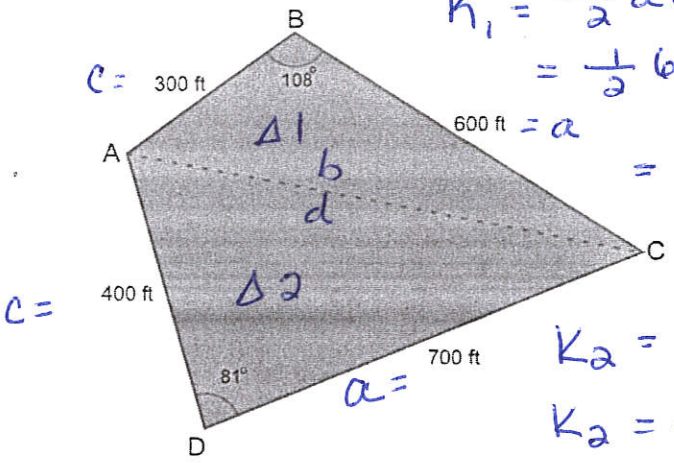
$K = 28.9$ sq units.

Area of a Triangle Formula:

K = (1/2)abSinC

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

∴ we need to determine another Δ



What is the area of the field (to the nearest square foot)?

(223, 871 square feet)

$K_1 = \frac{1}{2} ac \sin B$

$= \frac{1}{2} 600(300) \sin 108$

$= 85595$

$K_2 = \frac{1}{2} ac \sin D$

$K_2 = \frac{1}{2} 700(400) \sin 81$

$K_2 = 138276.$

Total = $K_1 + K_2$

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

$\frac{\sin 70}{9} = \frac{\sin B}{8}$

$\frac{8 \sin 70}{9} = \sin B$

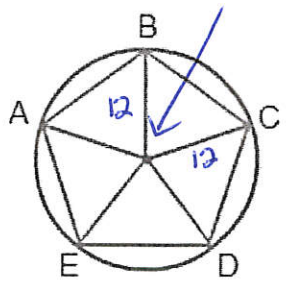
$.8353 = \sin B$

$56.6° = B$

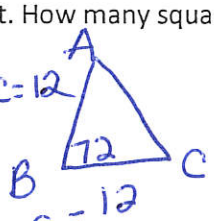
∴ $A = 180 - (70 + 56.6)$

$A = 53.4$

Ms. M wants to create a garden in the shape of a regular pentagon. To do this, she first uses a rope compass to make a circle with a radius of 12 feet. How many square feet of garden space will she have inside the pentagon?



$\frac{360}{5} = 72°$ c = 12



$K_\Delta = \frac{1}{2} ac \sin B$

$K_\Delta = \frac{1}{2} 12 \cdot 12 \cdot \sin 72$

$K_\Delta = 72 \sin 72$

$K_\Delta = 68.476$

$\times 5 \Delta s$

342.38 ft²