Math 1113	Sample Test 4	Name __________________________
Precalculus	Sections 6.1- 6.2	Date __________________________

NOTE: THIS IS ONLY 10 PROBLEMS. I WILL GIVE 20 PROBLEMS ON THE TEST !

Directions. Show all work. Circle final answers.

1. Use the information to solve the triangle.

   $A = 102.4^\circ$, $C = 16.7^\circ$, and $a = 21.6$

2. Use the information to solve the triangle.

   $C = 145^\circ$, $b = 4$, and $c = 14$

3. Use the information to solve the triangle.

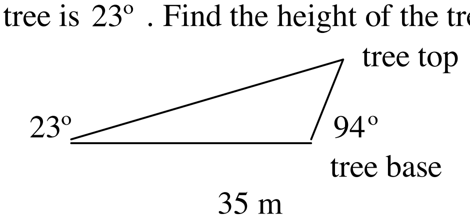
   $A = 76^\circ$, $a = 18$, and $b = 20$

4. Use the information to solve the triangle.

   $A = 58^\circ$, $a = 11.4$, and $b = 12.8$

5. Find the area of a triangular lot having two sides of lengths 105 meters and 64 meters and an included angle of $72^\circ\ 30'$.

6. Because of prevailing winds, a tree grew so that it was leaning 4° from the vertical. At a point 35 meters from the tree, the angle of elevation to the top of the tree is 23° . Find the height of the tree.



7. Use the information to solve the triangle.

$a = 11$, $b = 14$, $c = 20$

8. Use the information to solve the triangle.

$B = 10^{\circ}\ 35'$, $a = 40$, $c = 30$.

9. Use Heron's formula to find the area of the triangle.

$a = 12.32$, $b = 8.46$, $c = 15.05$

10. A triangular parcel of ground has sides of lengths 725 feet, 650 feet, and 575 feet. Find the measure of the largest angle.

Answers Sample Test 4

1.

Given: $A = 102.4°, C = 16.7°, a = 21.6$

$B = 180° - A - C = 60.9°$

$$b = \frac{a}{\sin A}(\sin B) = \frac{21.6}{\sin 102.4°}(\sin 60.9°) \approx 19.32$$

$$c = \frac{a}{\sin A}(\sin C) = \frac{21.6}{\sin 102.4°}(\sin 16.7°) \approx 6.36$$

2.

Given: $C = 145°,\ b = 4,\ c = 14$

$$\sin B = \frac{b \sin C}{c} = \frac{4 \sin 145°}{14} \approx 0.16388 \implies B \approx 9.43°$$

$$A = 180° - B - C \approx 180° - 9.43° - 145° = 25.57°$$

$$a = \frac{c}{\sin C}(\sin A) \approx \frac{14}{\sin 145°}(\sin 25.57°) \approx 10.53$$

3.

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

$$\sin B = \frac{b \sin A}{a} = \frac{20 \sin 76°}{18} = 1.0781$$

$$\sin B = 1.0781$$

NO SOLUTION POSSIBLE
sine value can't be larger that +1
1.0781 is larger than +1

4. Given A = $58°$, a = 11.4, b = 12.8

$$\sin B = \frac{b \sin A}{a} = \frac{12.8 \sin 58°}{11.4} \approx 0.9522 \implies B \approx 72.21° \text{ or } B \approx 107.79°$$

Case 1

$B \approx 72.21°$

$C = 180° - A - B \approx 49.79°$

$$c = \frac{a}{\sin A}(\sin C) \approx \frac{11.4 \sin 49.79°}{\sin 58°} \approx 10.27$$

Case 2

$B \approx 107.79°$

$C = 180° - A - B \approx 14.21°$

$$c = \frac{a}{\sin A}(\sin C) \approx \frac{11.4 \sin 14.21°}{\sin 58°} \approx 3.30$$

5.

$$\text{Area} = \tfrac{1}{2}ac \sin B = \tfrac{1}{2}(105)(64)\sin(72°30') \approx 3204.5$$

6.

$C = 180° - 23° - 94° = 63°$

$$h = \frac{35}{\sin 63°}(\sin 23°) \approx 15.3 \text{ meters}$$

7.

$a = 11, b = 14, c = 20$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab} = \frac{121 + 196 - 400}{2(11)(14)} \approx -0.2695 \implies C \approx 105.63°$$

$$\sin B = \frac{b \sin C}{c} = \frac{14 \sin 105.63°}{20} \approx 0.6741 \implies B \approx 42.38°$$

$A \approx 180° - 42.38° - 105.63° \approx 31.99°$

8.

Given: $B = 10° 35', a = 40, c = 30$

$$b^2 = a^2 + c^2 - 2ac \cos B = 1600 + 900 - 2(40)(30)\cos 10° 35' \approx 140.8268 \implies b \approx 11.87$$

$$\sin C = \frac{c \sin B}{b} = \frac{30 \sin 10° 35'}{11.87} \approx 0.4642 \implies C \approx 27.66° \approx 27° 40'$$

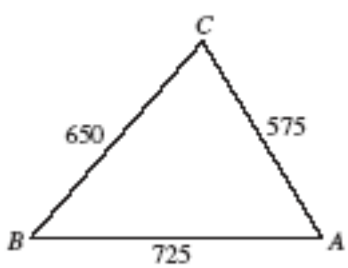
$A \approx 180° - 10° 35' - 27° 40' = 141° 45'$

9.

$$a = 12.32, b = 8.46, c = 15.05 \implies s = \frac{a + b + c}{2} = 17.915$$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{17.915(5.595)(9.455)(2.865)} \approx 52.11$$

10.



The largest angle is across from the largest side.

$$\cos C = \frac{650^2 + 575^2 - 725^2}{2(650)(575)}$$

$C \approx 72.3°$

YOU NEED TO KNOW THE LAW OF SINES !

Area of a Triangle

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

Area $= \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{1}{2}(a + b + c)$

<u>The Law of Cosines</u> - If A, B and C are the measures of the angles of a triangle and a, b and c are the lengths of the sides opposite these angles, then

$a^2 = b^2 + c^2 - 2bc\cos A$ OR $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

$b^2 = a^2 + c^2 - 2ac\cos B$ OR $\cos B = \dfrac{a^2 + c^2 - b^2}{2ac}$

$c^2 = a^2 + b^2 - 2ab\cos C$ OR $\cos C = \dfrac{a^2 + b^2 - c^2}{2ab}$