Name:_____ Date:_____

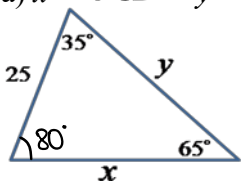
Pre-Calculus 11: Lesson 5 HW Sine Law

1. Given each equation, solve for all values of θ where $0 \le \theta \le 180^\circ$

a) $\sin\theta = 0.25$ $\theta = \sin^{-1}(0.25)$ $\theta = 14.478^\circ$ Quadrant #1 $= 14.478^\circ$ Quadrant #2 $= 165.522^\circ$	b) $\sin\theta = 0.85$ $\theta = \sin^{-1}(0.85)$ $\theta = 58.211^\circ$ Quadrant #1 $= 58.211^\circ$ Quadrant #2 $= 121.789^\circ$	c) $\sin\theta = \frac{\sqrt{3}}{2}$ $\theta = \sin^{-1}(\sqrt{3}/2)$ $\theta = 60^\circ$ Quadrant #1 $= 60^\circ$ Quadrant #2 $= 120^\circ$	d) $\sin\theta = \frac{\sqrt{2}}{2}$ $\theta = \sin^{-1}(\sqrt{2}/2)$ $\theta = 45^\circ$ Quadrant #1 $= 45^\circ$ Quadrant #2 $= 135^\circ$
e) $\sin\theta = 1.2$ $\theta = \sin^{-1}(1.2)$ $\theta =$ N/A Because sinθ can not be bigger than 1 //	f) $\sin\theta = -0.25$ $\theta = \sin^{-1}(-0.25)$ $\theta = -14.478^\circ$ Quadrant #3 $= 194.478^\circ$ Quadrant #4 $= 345.522^\circ$	g) $\sin\theta = 0$ $\theta = 0^\circ, 180^\circ, 360^\circ$	h) $\sin\theta = 1$ $\theta = 90^\circ$

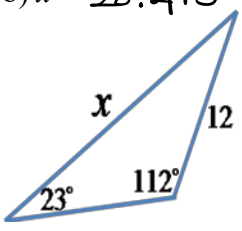
2. Given each triangle, find the value of any missing side or angle "x" and "y". Show all your work

a) $x =$ 15.822 $y =$ 27.165



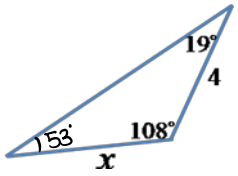
$$\frac{25}{\sin 65^\circ} = \frac{x}{\sin 35^\circ} = \frac{y}{\sin 80^\circ}$$

b) $x =$ 28.475°



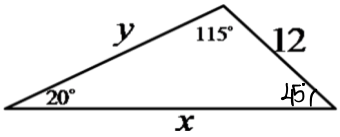
$$\frac{12}{\sin 23^\circ} = \frac{x}{\sin 112^\circ}$$

c) $x =$ 1.631



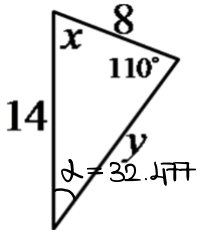
$$\frac{4}{\sin 53^\circ} = \frac{x}{\sin 19^\circ}$$

d) $x =$ 31.798 $y =$ 24.809



$$\frac{x}{\sin 115^\circ} = \frac{12}{\sin 20^\circ} = \frac{y}{\sin 45^\circ}$$

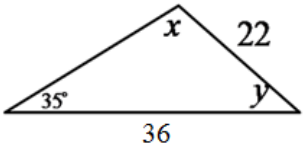
e) $x =$ 37.523° $y =$ 9.074



$$\frac{8}{\sin \alpha} = \frac{14}{\sin 110^\circ} \qquad \alpha = 32.477^\circ$$

$$\frac{y}{\sin 37.523^\circ} = \frac{14}{\sin 110^\circ}$$

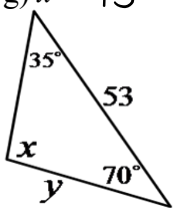
f) $x =$ 69.814° $y =$ 75.186°



$$\frac{22}{\sin 35^\circ} = \frac{36}{\sin x}$$

$$180^\circ - 35^\circ - 69.814^\circ = y$$

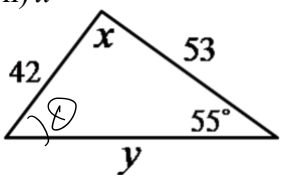
g) $x = 75^\circ$ $y = 31.472$



$180 - 70 - 35 = x$

$$\frac{53}{\sin 75^\circ} = \frac{y}{\sin 35^\circ}$$

h) $x =$ $y =$



$$\frac{53}{\sin\theta} = \frac{42}{\sin 55^\circ}$$

$\sin\theta = 1.03369$

However $\rightarrow -1 \leq \sin\theta \leq 1$

No solution

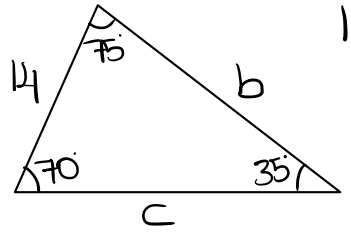
3. Given that $a = 14cm$, $b = 18cm$, and $\angle A = 41^\circ$, find the area of $\triangle ABC$.

$$\text{Area} = \frac{1}{2} \cdot ab\sin(C)$$

$$\frac{1}{2} \cdot (14) \cdot (18) \cdot (\sin 41^\circ)$$

$$= 82.66\ cm^2$$

4. Given that $a = 14cm$, $\angle B = 70^\circ$, and $\angle A = 35^\circ$, find the area of $\triangle ABC$.



$180^\circ - 35^\circ - 70^\circ = 75^\circ$

$$\frac{14}{\sin 35^\circ} = \frac{c}{\sin 75^\circ}$$

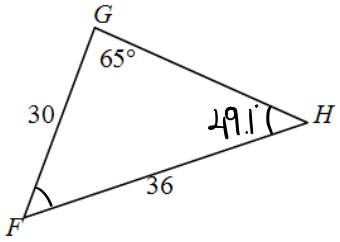
$c = 23.55\ cm$

$$\text{Area} = \frac{1}{2} \cdot a.c.\sin B$$

$$= \frac{1}{2} \cdot 14 \cdot (23.55) \cdot (\sin 70^\circ)$$

$$= 154.8\ cm^2$$

5. Find the value of angle "F"



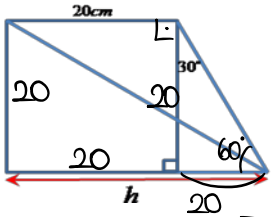
$\frac{36}{\sin 65^\circ} = \frac{30}{\sin H}$

$H = 49.1^\circ$

$F = 180 - 65 - 49.1$

$F = 65.9^\circ$

6. Calculate the length of "x" to 1 decimal place



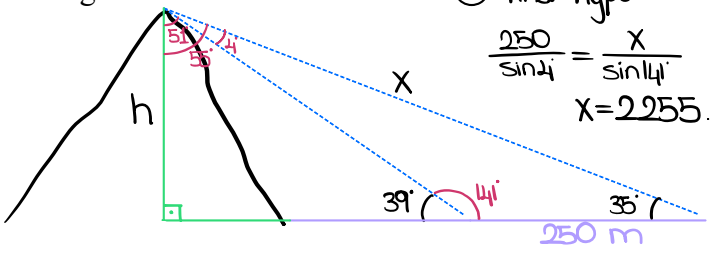
$\frac{20}{\sqrt{3}} = 11.547$ cm

$20 + 11.547$

$= 31.547$ cm

≈ 31.5 cm

7. An observer is looking at a mountain peek at an angle of elevation of 35degrees. He walks 250meters towards the mountain and the angle of elevation to the peak is 39degrees. What is the height of the mountain?



① find hypotenuse = x

$\frac{250}{\sin 4^\circ} = \frac{x}{\sin 141^\circ}$

$x = 2255.4$ m

② find the height

$\frac{2255.4}{\sin 90^\circ} = \frac{h}{\sin 35^\circ}$

$h = 1293.6$ m