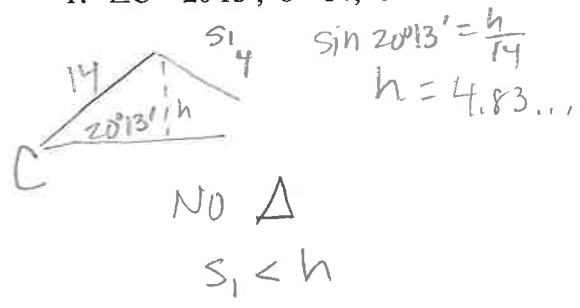**LSC Practice #3**   Name **Key**   Per.____

Given $\triangle ABC$: Solve the following triangles. Find all solutions. **Round sides to nearest tenth and angles to nearest minute. If it's not a triangle, explain why not.**

1. $\angle C = 20°13'$; $b = 14$; $c = 4$

$\sin 20°13' = \frac{h}{14}$

$h = 4.83...$

NO $\triangle$

$s_1 < h$

2. $\angle A = 28°15'$; $\angle B = 121°18'$; $c = 22.3$

$C = 30°27'$

$\frac{\sin 121°18'}{b} = \frac{\sin 30°27'}{22.3} = \frac{\sin 28°15'}{a}$

$a = \frac{22.3 \sin 28°15'}{\sin 30°27'} = 20.8$

$b = \frac{22.3 \sin 121°18'}{\sin 30°27'} = 37.6$

$A = 28°15'$	$a = 20.8$
$B = 121°18'$	$b = 37.6$
$C = 30°27'$	$c = 22.3$

3. $\angle A = 40°25'$; $a = 17$; $b = 20$

$\sin 40°25' = \frac{h}{20}$

$h = 12.97$

2 $\angle S$

$\frac{\sin B}{20} = \frac{\sin 40°25'}{17} = \frac{\sin 89°53'}{c}$

$\sin B = \frac{20 \sin 40°25'}{17}$ $B = 49°42'$ $c = \frac{17 \sin 89°53'}{\sin 40°25'} = 26.2$
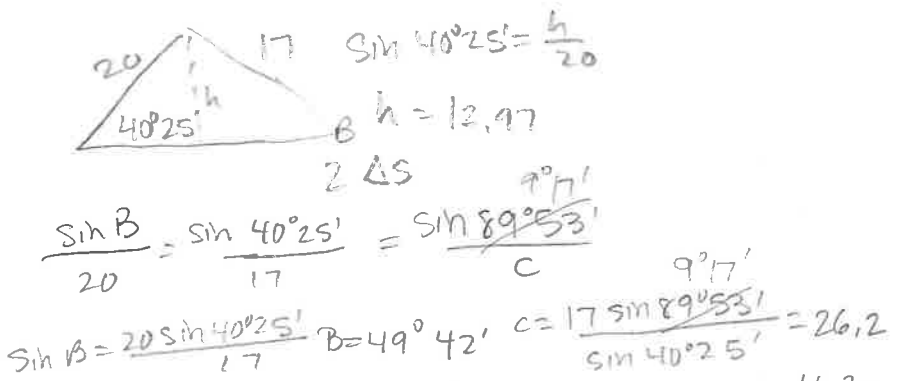
$B = 180 - $ ✗

1 $\triangle$		2 $\triangle$	
$A = 40°25'$	$a = 17$	$A = 40°25'$	$a = 17$
$B = 49°42'$	$b = 20$	$B = 130°18'$	$b = 20$
$C = 89°53'$	$c = 26.2$	$C = 9°17'$	$c = 4.2$

$C = 180 - A - B =$

4. $\angle A = 42°$; $c = 12$; $b = 16$

$a^2 = 12^2 + 16^2 - 2(12)(16)\cos 42°$

$a^2 = 114.6$ $a = 10.7...$

$\frac{\sin C}{12} = \frac{\sin 42°}{10.7...}$

$\sin C = \frac{12 \sin 42°}{10.7...}$ $C = 48°35'$

$B = 180 - A - C = 89°25'$

$A = 42°$	$a = 10.7$
$B = 89°25'$	$b = 16$
$C = 48°35'$	$c = 12$

5. $a = 12$; $b = 15$; $c = 30$

$\cos C = \frac{12^2 + 15^2 - 30^2}{2(12)(15)}$

NO $\triangle$
two smaller sides do not add up to be greater than the 3rd side.

6. Two adjacent sides of a parallelogram are 130 feet and 200 feet. The angle between these two sides is 75 degrees. Find the length of the shortest diagonal of the parallelogram and the area of the parallelogram.
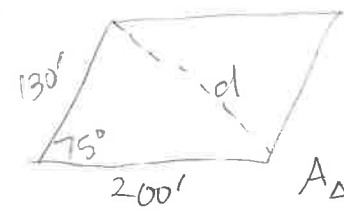
$d^2 = 130^2 + 200^2 - 2(130)200 \cos 75°$

$d^2 = 43441...$

$d = 208.43$ ft.

$A_\triangle = \left(\frac{1}{2} \cdot 130 \cdot 200 \sin 75°\right) \times 2$ for $\square$

$A = 25114.07$ ft^2

7. $b=12.3; \quad a=16.2; \quad c=6$

$$\cos A = \frac{12.3^2 + 6^2 - 16.2^2}{2 \cdot 12.3 \cdot 6}$$

$$A = 120°36'$$

$$\frac{\sin C}{6} = \frac{\sin 120°36'}{16.2}$$

$$\sin C = \frac{6 \sin 120°36'}{16.2}$$

$$C = 18°35'$$

$$B = 180° - A - C$$
$$= 40°49'$$

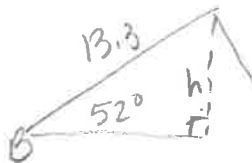|	
$A = 120°36'$	$a = 16.2$
$B = 40°49'$	$b = 12.3$
$C = 18°35'$	$c = 6$

8. Find the possible values of b that would produce the indicated number of triangles given that $B = 52°, c = 13.3$.

No triangles: $b < 10.5$

One Triangle: $b = 10.5, \quad b \geq 13.3$

Two Triangles: $10.5 < b < 13.3$

$$b \sin 52° = h$$
$$\frac{}{13.3}$$
$$h = 10.5$$

9. Find the area of a triangle with sides of 12 cm, 14 cm, 20 cm.

$$S = \frac{1}{2}(12 + 14 + 20) = 23$$

$$A = \sqrt{23(23-12)(23-14)(23-20)}$$

$$A = 82.65 \, cm^2$$

10. Find the area of a triangle if $\angle B = 120°15'; \quad a = 80; \quad c = 110$

$$A = \frac{1}{2}(80)(110) \sin 120°15'$$

$$A = 3800.88 \, u^2$$