Pre-Calculus **HW#6.2-2** **Name:** Key

Solve the following triangles.

1. a=5, b=8, c=10 (SSS)

$c^2 = b^2 + c^2 - 2bc\cos A$

$5^2 = 8^2 + 10^2 - 2\cdot 8\cdot 10\cdot \cos A$

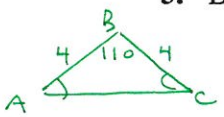
$A = 30°$
$B = 52°$
$C = 98°$

2. A=12°, B=58°, a=5 (AAS)

$\frac{\sin 12°}{5} = \frac{\sin 58°}{b}$ $\frac{\sin 12°}{5} = \frac{\sin 110°}{c}$

$b = 20.4$
$c = 22.6$
$C = 110°$

3. B=110°, a=4, c=4 (isosceles Δ or SAS)



$\frac{180-110}{2} = A = C = 35°$

$\frac{\sin 110°}{b} = \frac{\sin 35°}{4}$

$A = 35°$
$C = 35°$
$b = 6.6$

4. A=75°, a=2.5, b=16.5 (SSA)

$\frac{\sin 75°}{2.5} = \frac{\sin B}{16.5}$

NOT A Δ

5. A=15°, a=5, b=10 (SSA)

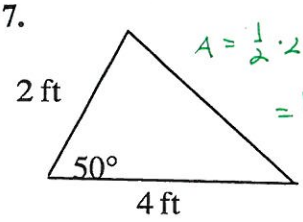
$B = 31°$	$B' = 149°$
$C = 134°$	$C' = 16°$
$c = 13.9$	$c' = 5.3$

6. B=115°, a=7, b=14.5 (SSA)

$A = 26°$
$C = 39°$
$c = 10.1$

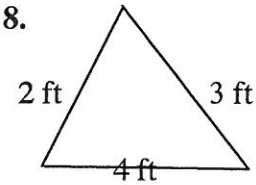
Find the area of each triangle.

7.



$A = \frac{1}{2}\cdot 2\cdot 4\cdot \sin 50°$
$= 3.1\ ft^2$

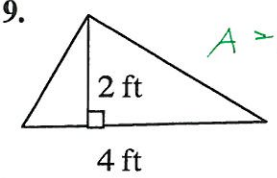
8.



$A = \sqrt{4.5(4.5-2)(4.5-3)(4.5-4)}$
$= 2.9\ ft^2$

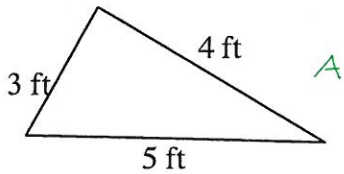
$S = \frac{1}{2}(2+3+4)$
$= 4.5$

9.



$A = \frac{1}{2}\cdot 4\cdot 2$
$= 4\ ft^2$

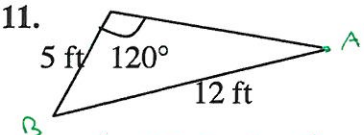
10.



$A = \sqrt{6(6-3)(6-4)(6-5)}$
$= 6\ ft^2$

$S = \frac{1}{2}(3+5+4)$
$= 6$

11.

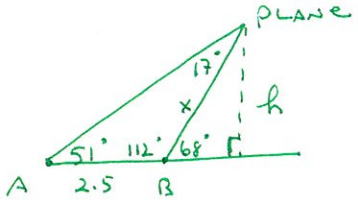


$\frac{\sin 120°}{12} = \frac{\sin A}{5}$

$A = 21°$
$B = 39°$

$A = \frac{1}{2}\cdot 5\cdot 12\cdot \sin 39°$
$= 18.9\ ft^2$

12. The angles of elevation to an airplane from two points A and B on the ground are 51° and 68°, respectively. The points A and B are 2.5 miles apart and the airplane is east of both points. Find the altitude of the plane.



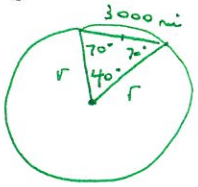
$\frac{\sin 17^\circ}{2.5} = \frac{\sin 51^\circ}{x}$

$x = 6.6$

$\sin 68^\circ = \frac{h}{6.6}$

$h = 6.1$ miles

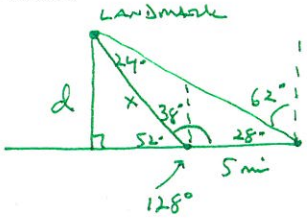
13. The circular arc of a railroad curve has a chord of length 3000 feet and a central angle of 40°. Find the radius of the circular arc.



$\frac{\sin 40^\circ}{3000} = \frac{\sin 70^\circ}{r}$

$r = 4385.7$ miles

14. A family is traveling due west on a road that passes a famous landmark. At a given time the bearing to the landmark is N62°W, and after the family travels 5 miles farther the bearing is N38°W. What is the closest the family will come to the landmark while on the road?



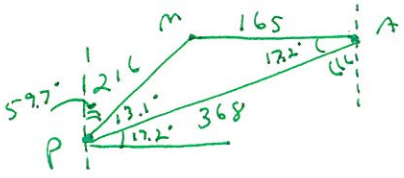
$\frac{\sin 24^\circ}{5} = \frac{\sin 28^\circ}{x}$

$x = 5.8$

$\sin 52^\circ = \frac{d}{5.8}$

$d = 4.6$ miles

15. On a map, Minneapolis is 165 mm due west of Albany. Phoenix is 216 mm from Minneapolis and 368 mm from Albany. Find the bearing of Minneapolis from Phoenix and the bearing of Albany from Phoenix.



$368^2 = 165^2 + 216^2 - 2 \cdot 165 \cdot 216 \cdot \cos M$

$M = 150^\circ$

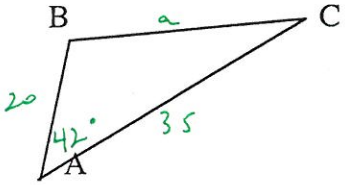
$216^2 = 165^2 + 368^2 - 2 \cdot 165 \cdot 368 \cdot \cos A$

$A = 17^\circ$ $\quad P = 13^\circ$

P to M: N 60° E

P to A: N 73° E

16. To determine the distance between two aircraft, a tracking station continuously determines the distance to each aircraft (B and C) and the angle A between them. Determine the distance a between the planes when A=42°, b=35 miles, and c=20 miles.



$a^2 = 20^2 + 35^2 - 2 \cdot 20 \cdot 35 \cdot \cos 42^\circ$

$a = 24.2$ miles