2017

PreCalculus
WS: 6.1 – 6.2 Review (For Test)

Name Key
Date ______ Block 2B, 1A

In 1 – 6, solve the triangle for all angles and sides. If two solutions exist, find both.

1. $c = 13, b = 8, B = 31°$

$\boxed{C = 56.82° \quad A = 92.18° \quad a = 15.52}$

$\boxed{C = 123.18° \quad A = 25.82° \quad a = 6.77}$

$\frac{\sin 31°}{8} = \frac{\sin C}{13}$

$\sin C = \frac{13(\sin 31°)}{8}$

$\frac{\sin 92.18°}{a} = \frac{\sin 31°}{8}$ $\qquad$ $\frac{\sin 25.82°}{a} = \frac{\sin 31°}{8}$

$a = \frac{8(\sin 92.18°)}{\sin 31°}$ $\qquad$ $a = \frac{8(\sin 25.82°)}{\sin 31°}$

2. ~~$A = 55°, b = 12, c = 7$~~

$\boxed{a = 9.83 \quad C = 35.68° \quad B = 89.32°}$

$a^2 = 12^2 + 7^2 - 2(12)(7)\cos 55°$

$a^2 \approx 96.64$

$\frac{\sin 55°}{9.83} = \frac{\sin C}{7}$

$\sin C = 0.583$

3. $a = 5.7, b = 2.3, c = 7.1$

$\boxed{A = 44.71° \quad C = 118.80° \quad B = 16.49°}$

$7.1^2 = 5.7^2 + 2.3^2 - 2(5.7)(2.3)\cos C$

$50.41 = 37.78 - 26.22\cos C$

$\cos C = -0.4817$

$\frac{\sin 118.80°}{7.1} = \frac{\sin A}{5.7}$ $\qquad$ $\sin A = \frac{5.7(\sin 118.80°)}{7.1}$

4. $A = 33°, B = 70°, b = 7$

$\boxed{C = 77° \quad a = 4.06 \quad c = 7.26}$

$\frac{\sin 33°}{a} = \frac{\sin 70°}{7}$

$a = \frac{7(\sin 33°)}{\sin 70°}$

$\frac{\sin 77°}{c} = \frac{\sin 70°}{7}$ $\qquad$ $c = \frac{7(\sin 77°)}{\sin 70°}$

5. $A = 45°, a = 1.4, b = 2$

$\frac{\sin 45°}{1.4} = \frac{\sin B}{2}$

$\sin B = \frac{2(\sin 45°)}{1.4}$

$\sin B = 1.01$

No Solution

6. $b = 4, c = 12, a = 9$

$12^2 = 4^2 + 9^2 - 2(4)(9)\cos C$

$144 = 97 - 72\cos C$

$\cos C \approx -0.6528$

$\frac{\sin 130.75°}{12} = \frac{\sin A}{9}$ $\qquad$ $\sin A = \frac{9\sin 130.75°}{12}$

$\boxed{C = 130.75° \quad A = 34.62° \quad B = 14.63°}$

In 7 – 9, find the area of the triangle to the nearest tenth.

7. $A = 52°, b = 14$ m, $c = 21$ m

$A = \frac{1}{2}bc\sin A = \frac{1}{2}(14)(21)\sin 52° = 115.8\,m^2$

8. $a = 5.7$ in., $b = 2.3$ in., $c = 7.1$in. $\qquad s = 7.55$

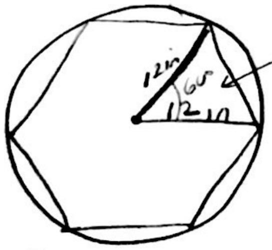
$A = \sqrt{7.55(7.55-5.7)(7.55-2.3)(7.55-7.1)} = 5.7\,in^2$

9. $a = 7$ cm, $b = 8$ cm, $c = 9$ cm $\qquad s = 12$

$\sqrt{12(12-7)(12-8)(12-9)} = \sqrt{720} \approx 26.83\,cm^2$

10 – 14, solve each problem. 6 sides

10. Find the area of a regular hexagon inscribed in a circle with a radius of 12 inches.

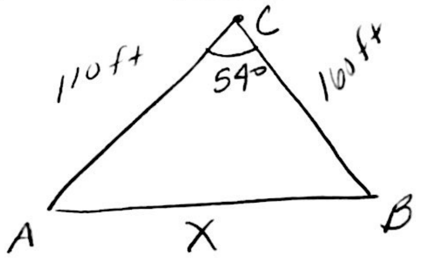


$A_\triangle = \frac{1}{2}(12)(12)\sin 60°$

$A_\triangle = 62.35$ inches

$A_{⬡} = 6(62.35) = 374.12 \text{ in}^2$

11. Miguel's specially trained measuring robot wants to find the distance between two points, *A* and *B*, on opposite sides of a building. The robot locates a point *C* that is 110 feet from *A* and 160 feet from *B*. If the angle at *C* is 54°, find *AB*.

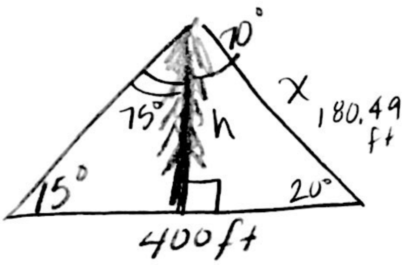


$x^2 = 110^2 + 160^2 - 2(110)(160)\cos 54°$

$x^2 \approx 17{,}009.95912$

$x \approx 130.42 \text{ ft}$

12. Two observers are 400 feet apart on opposite sides of a tree. The angles of elevation from the observers to the top of the tree are 15° and 20°. Find the height of the tree.



$\frac{\sin 145°}{400} = \frac{\sin 15°}{x}$

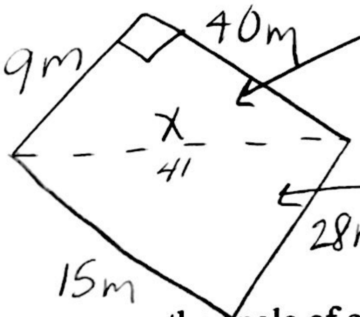
$x = \frac{400(\sin 15°)}{\sin 145°}$

$x = 180.49 \text{ ft}.$

$\sin 20° = \frac{h}{180.49}$

$h = 61.73$ feet

13. Find the area of a quadrilateral whose sides are 9 m, 40 m, 28 m and 15 m and the angle between the first two sides is 90°.



$A = \frac{1}{2}bh$

$A = \frac{1}{2}(9)(40)$

$A = 180 \text{ m}^2$

$x^2 = 9^2 + 40^2$

$x = 41 \text{ m}$

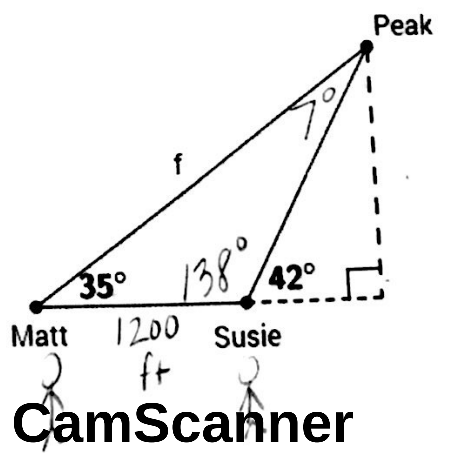
$A = \sqrt{s(s-a)(s-b)(s-c)}$

$A = \sqrt{42(27)(14)(1)} = 126 \text{ m}^2$

$s = 42$

Total area $= 306 \text{ m}^2$

14. Matt measures the angle of elevation of the peak of a mountain as 35°. Susie, who is 1200 feet closer to the mountain on a straight level path, measures the angle of elevation as 42°. How high is the mountain? (Hint: Find *f* first.)



$\frac{\sin 138°}{f} = \frac{\sin 7°}{1200}$

$f = \frac{1200(\sin 138°)}{\sin 7°}$

$f = 6588.67 \text{ ft}$

$\sin 35° = \frac{h}{6588.67}$

$h = 37$ ... ft