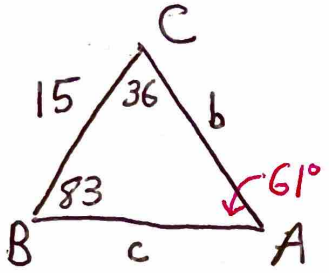
Accelerated Precalculus
Quiz Review WS #2 : Laws of Sines & Cosines

Law of Cosines (Memorize these)
$a^2 = b^2 + c^2 - 2bc(\cos A)$
$b^2 = a^2 + c^2 - 2ac(\cos B)$
$c^2 = a^2 + b^2 - 2ab(\cos C)$

Key

For #1 – 3, solve each triangle using the given information. Put your solutions for the **1st triangle** in the **top row** and for the **2nd triangle** (if there is one) use the **bottom row.**

1. $\angle C = 36°$, $\angle B = 83°$, a = 15 **ASA** Law of Sines



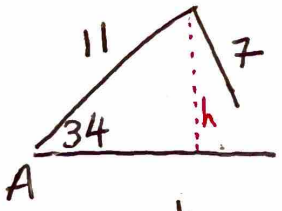
$\frac{b}{\sin 83} = \frac{15}{\sin 61}$ $\quad b = \frac{15\sin 83}{\sin 61}$ $\quad b = 17.022$

$\frac{c}{\sin 36} = \frac{15}{\sin 61}$ $\quad c = \frac{15\sin 36}{\sin 61}$ $\quad c = 10.081$

$A_1 =$ 61° $\quad b_1 =$ 17.022 $\quad c_1 =$ 10.081

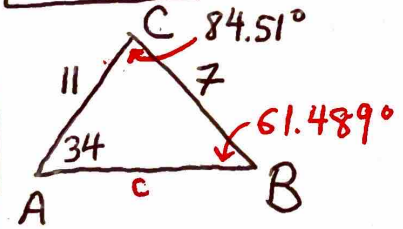
$A_2 =$ ____ $\quad b_2 =$ ____ $\quad c_2 =$ ____

2. $\angle A = 34°$, b = 11, a = 7 *SSA, Law of Sines
*since $6.151 < 7 < 11$, 2 triangles



$\sin 34 = \frac{h}{11}$
$h = 11\sin 34 = 6.151$

Triangle 1

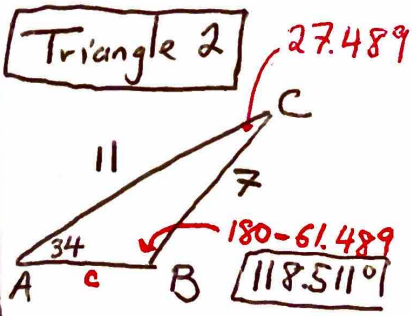


$\frac{\sin B}{11} = \frac{\sin 34}{7}$ $\quad \sin B = \frac{11\sin 34}{7}$ $\quad B = \sin^{-1}(0.8787)$ $\quad B = 61.489°$

$\frac{c}{\sin 84.51} = \frac{7}{\sin 34}$ $\quad c = \frac{7\sin 84.51}{\sin 34}$ $\quad c = 12.461$

$B_1 =$ 61.489° $\quad C_1 =$ 84.51° $\quad c_1 =$ 12.461

Triangle 2

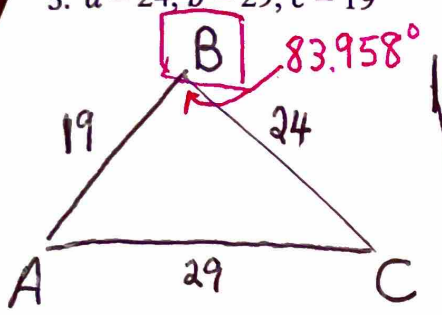


$\frac{c}{\sin 27.489} = \frac{7}{\sin 34}$ $\quad c = \frac{7\sin 27.489}{\sin 34}$ $\quad c = 5.778$

$B_2 =$ 118.511° $\quad C_2 =$ 27.489° $\quad c_2 =$ 5.778

3. $a = 24, b = 29, c = 19$

*SSS, start with Law of Cosine, 1 triangle



$b^2 = a^2 + c^2 - 2ac\cos B$

$29^2 = 24^2 + 19^2 - 2 \cdot 24 \cdot 19 \cos B$

$-24^2 \quad -19^2$

$\frac{-96}{-912} = \frac{-912\cos B}{-912}$

$0.10526 = \cos B$

$\cos B = 0.10526$

$B = \cos^{-1}(0.10526) \rightarrow B = 83.958°$

$\frac{\sin A}{24} = \frac{\sin 83.958}{29}$

$\sin A = \frac{24\sin 83.958}{29}$

$A = \sin^{-1}(0.8229)$

$A = 55.385°$

$A_1 =$ 55.385° $B_1 =$ 83.958°

$C_1 =$ 40.657°

$A_2 =$ _____ $B_2 =$ _____

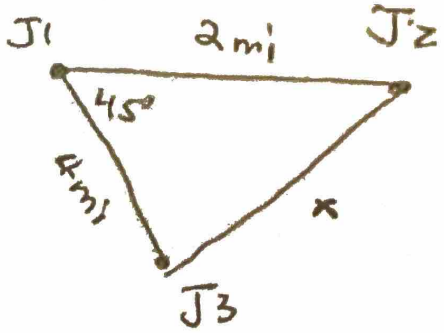
$C_2 =$ _____

$\angle C = 180 - 83.958 - 55.385$

$\angle C = 40.657°$

4) Three boats are at sea: Jenny one (J1), Jenny two (J2), and Jenny three (J3). The crew of J1 can see both J2 and J3. The angle between the line of sight to J2 and the line of sight to J3 is 45 degrees. If the distance between J1 and J2 is 2 miles and the distance between J1 and J3 is 4 miles, what is the distance between J2 and J3?

$(J_1)^2 = (J_2)^2 + (J_3)^2 - 2(J_2)(J_3)\cos(J_1)$



$x^2 = 2^2 + 4^2 - (2(2)(4)\cos 45°)$

$x^2 = 8.686$

$x = 2.94$