11/28 WED

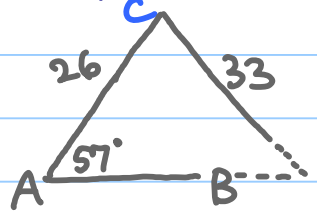
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ SSA

6.1 (part 2) Law of Sines ~ Ambiguous Case

- no Δ, one Δ, two Δ's

ex 1) A = 57°, a = 33, b = 26

SSA



✓ ∠A acute
✓ swing > fixed side
} one solution

$\frac{33}{\sin 57} = \frac{26}{\sin B}$

$33 \sin B = 26 \sin 57$

$\sin B = \frac{26 \sin 57}{33}$

$B = \sin^{-1}\left(\frac{26 \sin 57}{33}\right)$

$B = 41.4°$

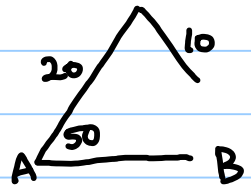
$m\angle C = 180 - (57 + 41.4°)$

$= 81.6°$

$\frac{c}{\sin 81.6} = \frac{33}{\sin 57}$

$c = \frac{33 \sin 81.6}{\sin 57} \approx 38.9$

ex 2) A = 50°, a = 10, b = 20

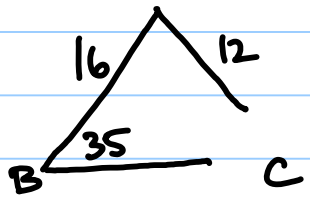


✓ ∠A acute
✓ swing < fixed side
✓ swing arm < height of Δ

swing arm: 10 < height of Δ: $b \sin A$, $20 \sin 50° = 15.3$ ☹

no solution

ex 3) B = 35°, b = 12 (swing), c = 16 (fixed)

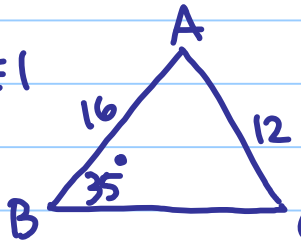


✓ ∠B acute
✓ swing < fixed
✓ swing < height of Δ

swing: 12 > height of Δ: $c \sin B$, $16 \sin 35° = 9.2$

→ two solutions

#1



$\frac{12}{\sin 35°} = \frac{16}{\sin C}$

$C = \sin^{-1}\left(\frac{16 \cdot \sin 35°}{12}\right)$

$C = 49.9°$

$m\angle A = 180 - (35 + 49.9)$

$= 95.1°$

$\frac{12}{\sin 35} = \frac{a}{\sin 95.1°}$

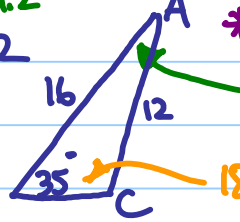
$a = \frac{12 \sin 95.1}{\sin 35}$

$a = 20.8$

#2

obtuse Δ

* ∠C is supplementary to ∠C in the acute Δ



$180 - 49.9° = 130.1°$

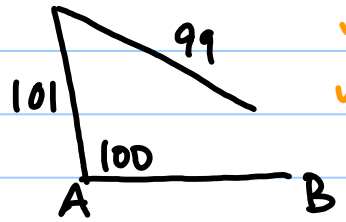
$m\angle A = 180 - (35 + 130.1)$

$= 14.9°$

$\frac{12}{\sin 35} = \frac{a}{\sin 14.9°}$

$a = \frac{12 \sin 14.9}{\sin 35} = 5.4$

ex 4) $A = 100°$, $a = 99$, $b = 101$



✓ ∠A obtuse

✓ swing < fixed

99 < 101

no solution

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