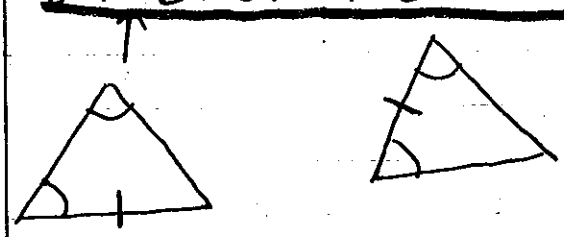
Day 81

14.4 Law of Sines

AAS or ASA : exactly 1 solution



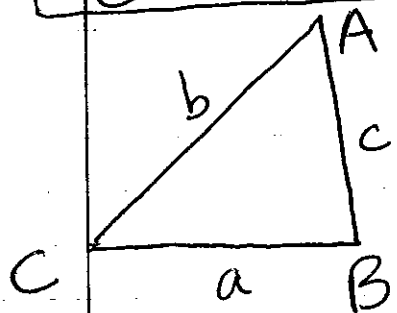
SSA "Ambiguous case"

If $\angle A$ is acute:

1. No solution : if $a < b\sin A$
2. 1 solution : if $a = b\sin A$ or $a \geq b$
3. 2 solutions : if $b\sin A < a < b$

If $\angle A$ is obtuse:

1. No solution if $a \leq b$
2. 1 solution if $a > b$



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

Law of Sines

Use law of sines + cosines to solve oblique $\triangle$'s (NOT right)

Law of Cosines (SSS, SAS)

p.807

ex 1 In $\triangle ABC$, $m\angle A = 35^\circ$ (acute), $a = 11$, and $b = 15$.

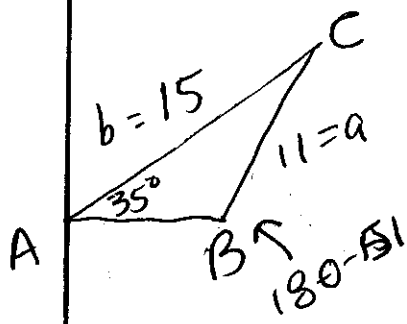
$b \sin A < a < b$

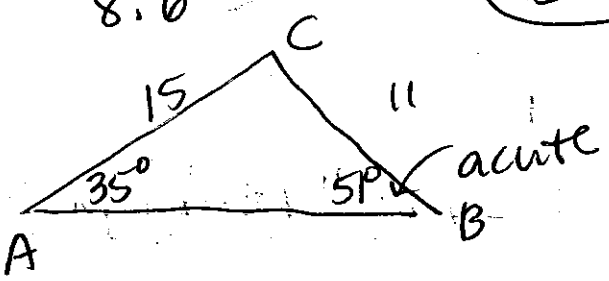
$15 \sin 35^\circ < 11 < 15$

8.6

SSA

\# 2 solutions





Find $m\angle B$.

$$\frac{\sin A}{a} = \frac{\sin B}{b} \rightarrow \frac{\sin 35^\circ}{11} = \frac{\sin B}{15}$$

$$\frac{\sin B \cdot 11}{11} = \frac{8.603}{11}$$

$\sin B = .782$

$m\angle B = \sin^{-1}(.782)$

$m\angle B \cong 51^\circ$

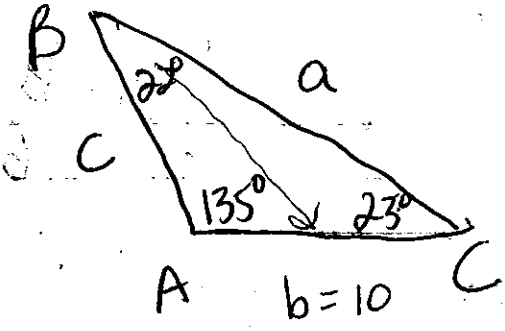
OR

$180 - 51^\circ$

$m\angle B \cong 129^\circ$

(2) Given $A = 135°$, $C = 23°$, $b = 10$

Find $m\angle B$. $= 22°$
$180 - 135° - 23°$



ASA

$\frac{\sin A}{a} = \frac{\sin B}{b}$

$\frac{\sin 135°}{a} = \frac{\sin 22°}{10}$

$a = \sin(135°) * 10 \div \sin(22)$

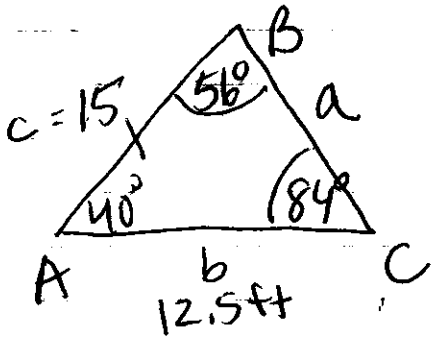
$a = 18.9$

$\frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{\sin 22°}{10} = \frac{\sin 23°}{c}$

$c = 10.4$

(3) Given $\angle B = 56°$, $\angle C = 84°$, $c = 15$ ft.



1st: draw picture
2nd: decide (AAS), ASA, SSA
3rd: solve.

$m\angle A = 180 - 56 - 84 = 40°$

$\frac{\sin 84°}{15} = \frac{\sin 40°}{a}$

$a = 9.7$ ft

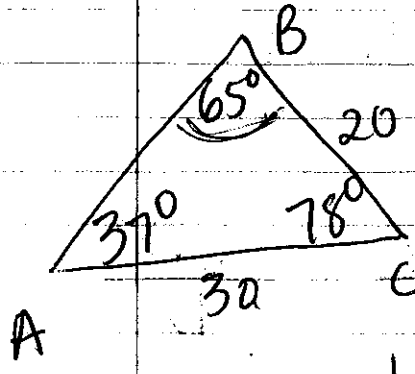
$\frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{\sin 56°}{b} = \frac{\sin 84°}{15}$

$b = 12.5$ Ft

acute

(ex) $\angle B = 65^\circ$, $a = 20$, $b = 30$



SSA

$30 \geq 20$

$\frac{b}{30} = \frac{a \sin B}{20 \sin 65^\circ}$

$30 > 18.1$

1 Solution

$\frac{\sin B}{b}$

$\frac{\sin 65^\circ}{30} = \frac{\sin A}{20}$

$m\angle C = 180^\circ - 37^\circ - 65^\circ$

$m\angle C = 78^\circ$

$\sin A = .60$

$A = \sin^{-1}(.60)$

$\angle A = 37^\circ$

* use inverses to find ∠'s.

$\frac{\sin(65)}{30} = \frac{\sin(78)}{c}$

$c = 32.4$

Name _____

AAS
ASA

The Law of Sines Homework

Use the Law of Sines to solve Δ ABC. DRAW A PICTURE!!!!!!!!

1. A = 25°, C = 55°, b = 12 B = a = c =
2. A = 62.2°, B = 50°, b = 5
3. C = 110°, B = 28°, a = 8
4. A = 155°, B = 15.5°, c = 20

Name _____

The Law of Sines "Ambiguous Case" SSA

Determine the number of triangles possible with the given parts.

1. A = 32°, a = 5.1, b = 10
2. A = 50°, a = 15, b = 14.3
3. A = 126°, a = 20, b = 25