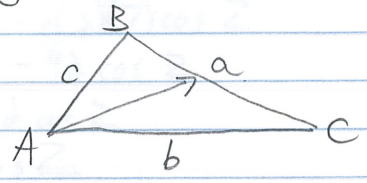
11-2 Review
11-3 Review
11-4 Review
11-5

Law of Cosines

Solving a Right Δ: Pythagorean Theorem gets you sides
SOH-CAH-TOA gets you sides and ∠'s.

Oblique (non-right) Δ: Now we have to adapt - Law of Cosines & Law of Sines

How we label:



Capital = ∠
lower-case = side

Law of Cosines

$a^2 = b^2 + c^2 - 2bc\cos A$
$b^2 = a^2 + c^2 - 2ac\cos B$
$c^2 = a^2 + b^2 - 2ab\cos C$

When it's a good idea to use it

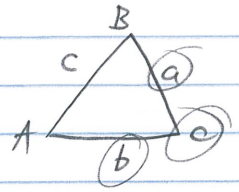
1) SSS - Make sure small + medium > large

2, 5, 6 — 2+5>6 → 7>6 ✓

1, 3, 7 — 1+3>7 → 4>7 — This Δ doesn't exist

3, 10, 9 — 3+10>9? No! 3+9>10 → 12>10 ✓

2) SAS - 2 sides and the included ∠
(all 3 letters are different)



Ex 1: In ΔXYZ, $\angle Y = 127°$, $x = 15.78$ in, $z = 8.54$ in (SAS!)
Find y.

$y^2 = x^2 + z^2 - 2xz\cos Y$
$y^2 = (15.78)^2 + (8.54)^2 - 2(15.78)(8.54)\cos 127$
$y^2 = 484.14$
$\boxed{y \approx 22.00 \text{ in}}$

(cont)

Ex 2: In $\triangle XYZ$, $x=3$, $y=7$, $z=9$. Find $m\angle Z$

$3+7>9$

$10>9$ ✓

$z^2 = x^2 + y^2 - 2xy\cos Z$

$9^2 = 3^2 + 7^2 - 2(3)(7)\cos Z$

$81 = 9 + 49 - 42\cos Z$

$81 = 58 - 42\cos Z$

$23 = -42\cos Z$

$\frac{23}{-42} = \cos Z$

$\cos^{-1}\left(\frac{23}{-42}\right) = \cos^{-1}(\cos Z)$

$\boxed{123.20^\circ = Z}$

CW/HW - wkshst