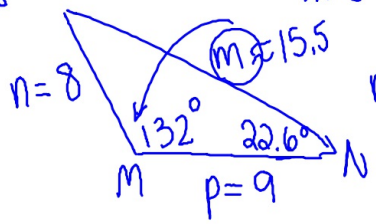
10-6 Law of Cosines/Δ Area

ex. 1 Solve ΔMNP, if ∠M = 132°, n = 8, p = 9.

SAS Δ



$m^2 = 8^2 + 9^2 - 2(8)(9)\cos 132°$

$m = \sqrt{\text{ans}}$

$m \approx 15.5$

$\angle P \approx 180 - (132° + 22.6°)$

$\angle P \approx 25.4°$

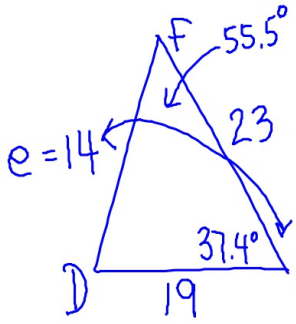
$\frac{\sin N}{8} = \frac{\sin 132°}{15.5}$

$\sin N = \frac{8 \sin 132°}{15.5}$

$\angle N \approx 22.6°$

ex. 2 Solve ΔDEF, if d = 23, e = 14, f = 19.

SSS Δ



$23^2 < 14^2 + 19^2$ acute

$14^2 = 19^2 + 23^2 - 2(19)(23)\cos E$

$196 = 890 - 874\cos E$

$-694 = -874\cos E$

$\frac{694}{874} = \cos E$

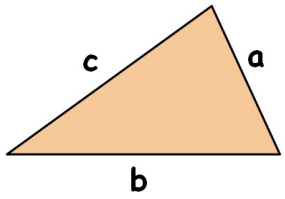
$\angle E \approx 37.4°$

$\frac{\sin f}{19} = \frac{\sin 37.4°}{14}$

$55.5° \approx \angle f = \sin^{-1}\left(\frac{19 \sin 37.4°}{14}\right)$

$87.1° \approx \angle D$

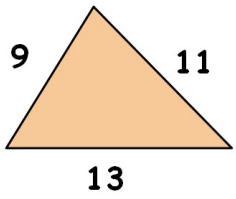
Heron's Formula (for SSS Δs)



$S = \frac{a+b+c}{2}$ (semiperimeter)

$\text{Area} = \sqrt{S(S-a)(S-b)(S-c)}$

ex. 3



$S = 16.5$

$\text{Area} = \sqrt{16.5(16.5-9)(16.5-11)(16.5-13)}$

$\approx 48.8\ u^2$