Warm Up 1/31

① $\sin^{-1}\left(\cos\left(\frac{7\pi}{6}\right)\right)$

$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$-\frac{\pi}{3}$

② $\cos^{-1}\left(\tan\left(\frac{3\pi}{4}\right)\right)$

$\cos^{-1}(-1)$

π

③ $\cos\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) + \arctan(1)\right)$

$\cos\left(\frac{\pi}{4} + \frac{\pi}{4}\right)$

$\cos\left(\frac{\pi}{2}\right) = 0$

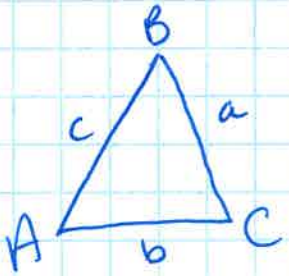
④ $\sin\left(2\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$

$\sin\left(2\left(\frac{\pi}{4}\right)\right)$

$\sin\left(\frac{\pi}{2}\right) = 1$

4.7 Day 1 ex 1, 2, 5, 6, 7

Goal: Refresh our memory on the Law of Sines + learn the Law of Cosines + Heron's formula.



Law of Cosines SAS, SSS

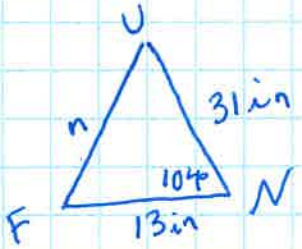
$a^2 = b^2 + c^2 - 2bc\cos A$

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

$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$ $\quad \cos C = \frac{a^2 + b^2 - c^2}{2ab}$

ex] Given $\triangle FUN$ Solve for complete $\triangle$

$F = 31$ in $u = 13$ in $N = 104°$



$n^2 = 13^2 + 31^2 - 2(13)(31)\cos 104°$

$n^2 = 1130 - 806\cos 104°$

$n = 36.400$ in

$\cos F = \frac{13^2 + 36.4^2 - 31^2}{2(13)(36.4)}$

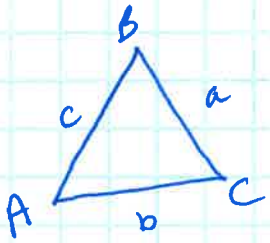
$F = \cos^{-1}\left(\frac{532.96}{946.4}\right)$

$F = 55.726°$

$U = 180° - (55.726 + 104)$

$U = 20.274°$

Law of Sines ASA, AAS, SSA

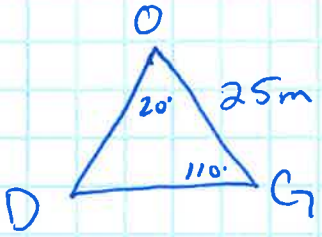


side $\quad \frac{b}{\sin B} = \frac{a}{\sin A} = \frac{c}{\sin C}$

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

ex/yt Given $\triangle DOG$ $\quad d = 25m$, $O = 20°$, $G = 110°$

find g



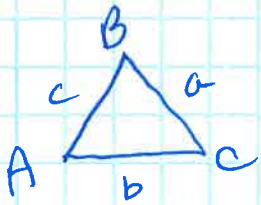
$D = 180° - (110° + 20°)$

$D = 50°$

$$\frac{g}{\sin 110°} = \frac{25}{\sin 50°}$$

$$g = \frac{25 \sin 110°}{\sin 50°} m \qquad g = 30.667 m$$

Area of $\triangle$ given SSS



Heron's formula

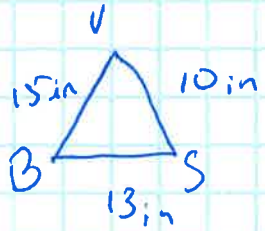
$$S = \frac{a+b+c}{2} \quad \text{(Semi-Perimeter)}$$

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

ex Given $\triangle BUS$

$b = 10in \quad u = 13in \quad s = 15in$

Find the area



$$S = \frac{10+13+15}{2}$$

$S = 19$

$$A = \sqrt{19(19-10)(19-15)(19-13)}$$

$A = \sqrt{4104}$

$A = 64.062 \ in^2$