Double-Angle Formulas: $\sin(2u) = 2\sin(u)\cos(u)$, $\cos(2u) = \cos^2(u) - \sin^2(u) = 2\cos^2(u) - 1 = 1 - 2\sin^2(u)$,

$\tan(2u) = \dfrac{2\tan(u)}{1-\tan^2(u)} = \dfrac{\sin(2u)}{\cos(2u)}$!

Half-Angle Formulas: $\sin\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1-\cos(u)}{2}}$, $\cos\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1+\cos(u)}{2}}$, $\tan\left(\frac{u}{2}\right) = \frac{1-\cos(u)}{\sin(u)} = \frac{\sin\left(\frac{u}{2}\right)}{\cos\left(\frac{u}{2}\right)}$!!!`

You have to determine the "$\pm$" by determining the quadrant in which $\frac{u}{2}$ resides.

Power-Reducing Formulas: $\sin^2(u) = \dfrac{1-\cos(2u)}{2}$, $\cos^2(u) = \dfrac{1+\cos(2u)}{2}$, $\tan^2(u) = \dfrac{1-\cos(2u)}{1+\cos(2u)} = \dfrac{\sin^2(u)}{\cos^2(u)}$

Product-to-Sum Formulas

$\sin u \sin v = \frac{1}{2}[\cos(u-v) - \cos(u+v)]$

$\cos u \cos v = \frac{1}{2}[\cos(u-v) + \cos(u+v)]$

$\sin u \cos v = \frac{1}{2}[\sin(u+v) + \sin(u-v)]$

Sum-to-Product Formulas

$\sin u + \sin v = 2\sin\left(\frac{u+v}{2}\right)\cos\left(\frac{u-v}{2}\right)$

$\cos u + \cos v = 2\cos\left(\frac{u+v}{2}\right)\cos\left(\frac{u-v}{2}\right)$

$\cos u - \cos v = -2\sin\left(\frac{u+v}{2}\right)\sin\left(\frac{u-v}{2}\right)$

Pythagorean Identities

$\tan^2(x) + 1 = \sec^2(x)$

$\cot^2(x) + 1 = \csc^2(x)$

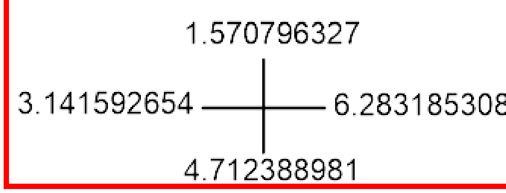
Angle Sum Formulas

$\sin(u+v) = \sin(u)\cos(v) + \sin(v)\cos(u)$

$\cos(u+v) = \cos(u)\cos(v) - \sin(u)\sin(v)$

$\tan(u+v) = \dfrac{\tan(u)+\tan(v)}{1-\tan(u)\tan(v)}$

Radians without π



Law of Sines $\dfrac{\sin A}{a} = \dfrac{\sin B}{b} = \dfrac{\sin C}{c}$ **Law of Cosines** $a^2 = b^2 + c^2 - 2bc\cos A$

Heron's $Area = \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \dfrac{a+b+c}{2}$. **Magnitude** $\bar{u} = \langle a, b\rangle \Rightarrow \|\bar{u}\| = \sqrt{a^2 + b^2}$

Arc Length: $s = r\theta$, **Area of a Sector:** $A = \frac{1}{2}r^2\theta$

This is a cheat sheet for later in the semester. I put the stuff we'll be using on Test 2 in boxes.