Math 101 Formula Sheet Spring 2022

For Midterms and Exams

Trigonometric Formulæ

Basic Identities

- $\cos^2(\theta) + \sin^2(\theta) = 1$
- $\tan^2(\theta) + 1 = \sec^2(\theta)$
- $\sin(2\theta) = 2\sin(\theta)\cos(\theta)$
- $\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$

Half Angle Identities

- $\sin^2(\theta) = \dfrac{1 - \cos(2\theta)}{2}$
- $\cos^2(\theta) = \dfrac{1 + \cos(2\theta)}{2}$

Ptolemy's Identities

- $\sin(A + B) = \sin(A)\cos(B) + \cos(A)\sin(B)$
- $\cos(A + B) = \cos(A)\cos(B) - \sin(A)\sin(B)$
- $\tan(A + B) = \dfrac{\tan(A) + \tan(B)}{1 - \tan(A)\tan(B)}$

Product to Sum

- $\sin(A)\sin(B) = \dfrac{1}{2}\cos(A - B) - \dfrac{1}{2}\cos(A + B)$
- $\cos(A)\cos(B) = \dfrac{1}{2}\cos(A - B) + \dfrac{1}{2}\cos(A + B)$
- $\sin(A)\cos(B) = \dfrac{1}{2}\sin(A - B) + \dfrac{1}{2}\sin(A + B)$

Even and Odd Properties

- $\sin(-\theta) = -\sin(\theta)$
- $\cos(-\theta) = \cos(\theta)$
- $\tan(-\theta) = -\tan(\theta)$

Reflections

- $\sin\left(\dfrac{\pi}{2} - \theta\right) = \cos(\theta)$
- $\cos\left(\dfrac{\pi}{2} - \theta\right) = \sin(\theta)$
- $\tan\left(\dfrac{\pi}{2} - \theta\right) = \cot(\theta)$
- $\sin(\pi - \theta) = \sin(\theta)$
- $\cos(\pi - \theta) = -\cos(\theta)$
- $\tan(\pi - \theta) = -\tan(\theta)$