MATH 1700: LECTURE 7 (JUNE 20)

7.3 Trigonometric Substitution

Expression	Substitution	Identity
$\sqrt{a^2 - x^2}$	$x = a\sin\theta,\ \theta \in [-\frac{\pi}{2}, \frac{\pi}{2}]$	$1 - \sin^2\theta = \cos^2\theta$
$\sqrt{a^2 + x^2}$	$x = a\tan\theta,\ \theta \in (-\frac{\pi}{2}, \frac{\pi}{2})$	$1 + \tan^2\theta = \sec^2\theta$
$\sqrt{x^2 - a^2}$	$x = a\sec\theta,\ \theta \in [0, \frac{\pi}{2}) \bigcup [\pi, \frac{3\pi}{2})$	$\sec^2\theta - 1 = \tan^2\theta$

Table 1. **Table of Trignometric Substitutions**