

Trigonometric Substitution Chart

JL

Form:	$\sqrt{a^2 - b^2 x^2}$	$\sqrt{a^2 + b^2 x^2}$	$\sqrt{b^2 x^2 - a^2}$
Trig Identity:	$1 - \sin^2\Theta = \cos^2\Theta$	$1 + \tan^2\Theta = \sec^2\Theta$	$\sec^2\Theta - 1 = \tan^2\Theta$
Substitutions:	$x = \frac{a}{b} \sin\Theta$ $dx = \frac{a}{b} \cos\Theta d\Theta$ $-\frac{\pi}{2} \leq \Theta \leq \frac{\pi}{2}$	$x = \frac{a}{b} \tan\Theta$ $dx = \frac{a}{b} \sec^2\Theta d\Theta$ $-\frac{\pi}{2} < \Theta < \frac{\pi}{2}$	$x = \frac{a}{b} \sec\Theta$ $dx = \frac{a}{b} \sec\Theta \tan\Theta d\Theta$ $0 < \Theta < \frac{\pi}{2}, \frac{\pi}{2} < \Theta < \pi$
Re-substitution:	$\Theta = \arcsin\left(\frac{b}{a}x\right)$	$\Theta = \arctan\left(\frac{b}{a}x\right)$	$\Theta = \operatorname{arcsec}\left(\frac{b}{a}x\right)$ $= \arccos\left(\frac{a}{b}x\right)$
Triangles:			