

Substituições Trigonômétricas

TRIGONOMETRIC SUBSTITUTIONS

EXPRESSION IN THE INTEGRAND	SUBSTITUTION	RESTRICTION ON θ	SIMPLIFICATION
$\sqrt{a^2 - x^2}$	$x = a \sin \theta$	$-\pi/2 \leq \theta \leq \pi/2$	$a^2 - x^2 = a^2 - a^2 \sin^2 \theta = a^2 \cos^2 \theta$
$\sqrt{a^2 + x^2}$	$x = a \tan \theta$	$-\pi/2 < \theta < \pi/2$	$a^2 + x^2 = a^2 + a^2 \tan^2 \theta = a^2 \sec^2 \theta$
$\sqrt{x^2 - a^2}$	$x = a \sec \theta$	$\begin{cases} 0 \leq \theta < \pi/2 & (\text{if } x \geq a) \\ \pi/2 < \theta \leq \pi & (\text{if } x \leq -a) \end{cases}$	$x^2 - a^2 = a^2 \sec^2 \theta - a^2 = a^2 \tan^2 \theta$

Tabela de Substituições Trigonômétricas

Expressão	Substituição	Identidade
$\sqrt{a^2 - x^2}$	$x = a \operatorname{sen} \theta, \quad -\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$	$1 - \operatorname{sen}^2 \theta = \cos^2 \theta$
$\sqrt{a^2 + x^2}$	$x = a \operatorname{tg} \theta, \quad -\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$	$1 + \operatorname{tg}^2 \theta = \sec^2 \theta$
$\sqrt{x^2 - a^2}$	$x = a \sec \theta, \quad 0 \leq \theta < \frac{\pi}{2} \text{ ou } \pi \leq \theta < \frac{3\pi}{2}$	$\sec^2 \theta - 1 = \operatorname{tg}^2 \theta$