

8.3.2 Trigonometric Substitutions

Some finesse substitutions involve introducing a trig function in order to exploit identities and ultimately make the forms easier to deal with

For example, if a function contains $\sqrt{a^2 - x^2}$, it usually works to substitute $x = a \sin \theta$

If a function contains $\sqrt{x^2 - a^2}$, $\sqrt{x^2 - a^2} \rightarrow x = a \sec \theta$

And for $f(x^2 + a^2) \rightarrow x = a \tan \theta$

Ex 1 $\int \sqrt{1 - x^2} dx$

Ex 2 $\int \frac{x^2}{9 + x^2} dx$

Ex 3 $\int \frac{\sqrt{x^2 - 4}}{x} dx$

Ex 4 $\int \frac{4}{\sqrt{x}\sqrt{1-x}} dx$

p.581#17, 18 do5,20