

Inverse Trigonometric Integral Identities

$$\int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1} \left(\frac{u}{a} \right) + C, \quad u^2 < a^2$$

$$\int \frac{du}{a^2 + u^2} = \frac{1}{a} \tan^{-1} \left(\frac{u}{a} \right) + C$$

$$\int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{a} \sec^{-1} \left| \frac{u}{a} \right| + C, \quad u^2 > a^2$$

Inverse Hyperbolic-Trig Integral Identities

$$\int \frac{du}{\sqrt{a^2 + u^2}} = \sinh^{-1} \left(\frac{u}{a} \right) + C, \quad a > 0$$

$$\int \frac{du}{\sqrt{u^2 - a^2}} = \cosh^{-1} \left(\frac{u}{a} \right) + C, \quad u > a > 0$$

$$\int \frac{du}{a^2 - u^2} = \frac{1}{a} \tanh^{-1} \left(\frac{u}{a} \right) + C, \quad \text{if } u^2 < a^2$$

$$\int \frac{du}{a^2 - u^2} = \frac{1}{a} \coth^{-1} \left(\frac{u}{a} \right) + C, \quad \text{if } u^2 > a^2$$

$$\int \frac{du}{u\sqrt{a^2 - u^2}} = -\frac{1}{a} \operatorname{sech}^{-1} \left(\frac{u}{a} \right) + C, \quad 0 < u < a$$

$$\int \frac{du}{u\sqrt{a^2 + u^2}} = -\frac{1}{a} \operatorname{csch}^{-1} \left| \frac{u}{a} \right| + C, \quad u \neq 0$$

Identities for Hyperbolic Functions

$$\sinh 2x = 2 \sinh x \cosh x$$

$$\cosh 2x = \cosh^2 x + \sinh^2 x$$

$$\cosh^2 x = (\cosh 2x + 1)/2$$

$$\sinh^2 x = (\cosh 2x - 1)/2$$

$$\cosh^2 x - \sinh^2 x = 1$$