Differentiate:

$\sec(ax) \rightarrow a\sec(ax)\tan(ax)$ $\qquad \left[\sec(x) \equiv \frac{1}{\cos(x)}\right]$

$\tan(ax) \rightarrow a\sec^2(ax)$ $\qquad \left[\tan(x) \equiv \frac{\sin(x)}{\cos(x)}\right]$

$\csc(ax) \rightarrow -a\csc(ax)\cot(ax)$ $\qquad \left[\csc(x) \equiv \frac{1}{\sin(x)}\right]$

$\cot(ax) \rightarrow -a\csc^2(ax)$ $\qquad \left[\cot(x) \equiv \frac{\cos(x)}{\sin(x)}\right]$

$\arcsin\left(\frac{x}{a}\right) \rightarrow \frac{1}{\sqrt{a^2-x^2}}$ $\qquad\qquad \text{arsinh}\left(\frac{x}{a}\right) \rightarrow \frac{1}{\sqrt{x^2+a^2}}$

$\arccos\left(\frac{x}{a}\right) \rightarrow \frac{-1}{\sqrt{a^2-x^2}}$ $\qquad\qquad \text{arcosh}\left(\frac{x}{a}\right) \rightarrow \frac{1}{\sqrt{x^2-a^2}}$

$\arctan\left(\frac{x}{a}\right) \rightarrow \frac{a}{a^2+x^2}$ $\qquad\qquad \text{artanh}\left(\frac{x}{a}\right) \rightarrow \frac{a}{a^2-x^2}$

Integrate: $\quad (+C)$

$a^x \rightarrow \frac{a^x}{\ln(a)}$

$\tan(x) \rightarrow -\ln|\cos(x)|$

$\cos\theta\sin^n\theta \rightarrow \frac{\sin^{n+1}\theta}{n+1}$ $\quad$ (same for $\sin\theta\cos^n\theta$, just switched)

$\sinh(x) \rightarrow \cosh(x)$

$\cosh(x) \rightarrow \sinh(x)$

$\tanh(x) \rightarrow \ln|\cosh(x)|$