Math 142 Integration Formulas

You should know and be able to use all of the following formulas.

Power Rule \((n \neq -1)\)

\[ \int u^n \, du = \frac{u^{n+1}}{n+1} + C \]

Trig Functions

\[ \int \sin u \, du = - \cos u + C \]
\[ \int \cos u \, du = \sin u + C \]
\[ \int \sec^2 u \, du = \tan u + C \]
\[ \int \csc^2 u \, du = - \cot u + C \]
\[ \int \sec u \tan u \, du = \sec u + C \]
\[ \int \csc u \cot u \, du = - \csc u + C \]

Logarithm Rule

\[ \int \frac{1}{u} \, du = \ln |u| + C \]

Exponential Rules \((b > 0 \text{ and } b \neq 1)\)

\[ \int b^u \, du = \frac{b^u}{\ln b} + C \]
\[ \int e^u \, du = e^u + C \]

Inverse Trig Functions \((a > 0)\)

\[ \int \frac{1}{1 + u^2} \, du = \tan^{-1} u + C \]
\[ \int \frac{1}{a^2 + u^2} \, du = \frac{1}{a} \tan^{-1} \frac{u}{a} + C \]
\[ \int \frac{1}{\sqrt{1 - u^2}} \, du = \sin^{-1} u + C \]
\[ \int \frac{1}{\sqrt{a^2 - u^2}} \, du = \sin^{-1} \frac{u}{a} + C \]
\[ \int \frac{1}{u \sqrt{u^2 - 1}} \, du = \sec^{-1} |u| + C \]
\[ \int \frac{1}{u \sqrt{u^2 - a^2}} \, du = \frac{1}{a} \sec^{-1} \frac{|u|}{a} + C \]