Fundamental Rules of Integration

\[ \int x^n \, dx = \frac{x^{(n+1)}}{(n+1)} + C \]

- Add 1 to the exponent
- Divide by the new exponent \((n+1)\)
- Add \(C\) for some possible constant. If you recall, when you take the derivative: constants go to zero. \(C\) is only added on indefinite integrals (no specific limit of integration)

\[ \int e^x \, dx = e^x + C \]

- Recall that the derivative of \(e^x \, dx\) is \(e^x\)
- Think in terms of the anti-derivative... what derivative would give you the value you are integrating

\[ \int \frac{1}{x} \, dx = \ln|x| + C \]

- Think in terms of anti-derivative, the derivative of what gives you \(\frac{1}{x}\)
- The absolute is due to the fact that you cannot take the \(\ln\) of a negative

\[ \int \sin x \, dx = -\cos x + C \]

- Think in terms of anti-derivative