

Simplifying some integrals

A lot of these integrals are very long. Some substitutions can be done in your head. Let's say $F(x)$ is an antiderivative of $f(x)$. Then $\int f(ax + b) dx = \frac{1}{a}F(ax + b) + C$ when a and b are constants. So if $f(x)$ is a standard function (whose antiderivative you know), then this is useful if integrating $f(ax + b)$.

Examples:

$$\int \cos(3x + 4) dx = \frac{1}{3}\sin(3x + 4) + C$$

$$\int \sin(x + 5) dx = -\cos(x + 5) + C$$

$$\int \sec^2(6x) dx = \frac{1}{6}\tan(6x) + C$$

$$\int e^{3x+4} dx = \frac{1}{3}e^{3x+4} + C$$

$$\int e^{5-x} dx = -e^{5-x} + C$$

$$\int \frac{1}{3x+4} dx = \frac{1}{3}\ln(|3x + 4|) + C$$

$$\int \frac{5}{x+7} dx = 5\ln(|x + 7|) + C.$$

DO NOT OVER USE THIS!

This does not apply to $\int \cos(x^2) dx$.