Math 21B
Kouba
Trig Identities and Antiderivatives

You need NOT memorize identities number 1. through 4.).

1.) \(\sin(A + B) = \sin A \cos B + \cos A \sin B\)
2.) \(\sin(A - B) = \sin A \cos B - \cos A \sin B\)
3.) \(\cos(A + B) = \cos A \cos B - \sin A \sin B\)
4.) \(\cos(A - B) = \cos A \cos B + \sin A \sin B\)

You MUST memorize the following identities and antiderivatives.

5.) \(\cos^2 x + \sin^2 x = 1\)
6.) \(\sin 2x = 2 \sin x \cos x\)
7.) \(\cos 2x = 2 \cos^2 x - 1\) so that \(\cos^2 x = \frac{1 + \cos 2x}{2}\)

\[= 1 - 2 \sin^2 x\] so that \(\sin^2 x = \frac{1 - \cos 2x}{2}\)

\[= \cos^2 x - \sin^2 x\]
8.) \(1 + \tan^2 x = \sec^2 x\) so that \(\tan^2 x = \sec^2 x - 1\)
9.) \(1 + \cot^2 x = \csc^2 x\) so that \(\cot^2 x = \csc^2 x - 1\)

10.) \(\int \cos x \, dx = \sin x + C\)
11.) \(\int \sin x \, dx = -\cos x + C\)
12.) \(\int \sec^2 x \, dx = \tan x + C\)
13.) \(\int \csc^2 x \, dx = -\cot x + C\)
14.) \(\int \sec x \tan x \, dx = \sec x + C\)
15.) \(\int \csc x \cot x \, dx = -\csc x + C\)
16.) \(\int \tan x \, dx = \ln |\sec x| + C\)
17.) \(\int \cot x \, dx = \ln |\sin x| + C\)
18.) \(\int \sec x \, dx = \ln |\sec x + \tan x| + C\)
19.) \(\int \csc x \, dx = \ln |\csc x - \cot x| + C\)
20.) \(\int \frac{1}{1+x^2} \, dx = \arctan x + C\)
21.) \(\int \frac{1}{\sqrt{a^2 + x^2}} \, dx = \frac{1}{a} \arctan \frac{x}{a} + C\)
22.) \(\int \frac{1}{\sqrt{a^2 - x^2}} \, dx = \arcsin \frac{x}{a} + C\)
23.) \(\int \frac{1}{x \sqrt{x^2 - 1}} \, dx = \arcsin \frac{x}{a} + C\)
24.) \(\int \frac{1}{x \sqrt{x^2 - a^2}} \, dx = \frac{1}{a} \arcsin \frac{x}{a} + C\)