

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 $\cot^2 x = \csc^2 x - 1$

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| 10.) $\int \cos x \, dx = \sin x + C$ | 20.) $\int \frac{1}{1+x^2} \, dx = \arctan x + C$ |
| 11.) $\int \sin x \, dx = -\cos x + C$ | and $\int \frac{1}{a^2+x^2} \, dx = \frac{1}{a} \arctan \frac{x}{a} + C$ |
| 12.) $\int \sec^2 x \, dx = \tan x + C$ | 21.) $\int \frac{1}{\sqrt{1-x^2}} \, dx = \arcsin x + C$ |
| 13.) $\int \csc^2 x \, dx = -\cot x + C$ | and $\int \frac{1}{\sqrt{a^2-x^2}} \, dx = \arcsin \frac{x}{a} + C$ |
| 14.) $\int \sec x \tan x \, dx = \sec x + C$ | 22.) $\int \frac{1}{ x \sqrt{x^2-1}} \, dx = \operatorname{arcsec} x + C$ |
| 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.) $\int \csc x \, dx = \ln \csc x - \cot x + C$ | |