CALC 2 - REVIEW/PREVIEW UNIT 2

TEST YOURSELF ON THESE BASIC ANTI-DERIVATIVES

1. For $n \neq -1$:

$$\int x^n dx = \frac{1}{n+1} x^{n+1} + C$$

2. $\int \frac{1}{x} dx = \ln|x| + C$

3. $\int e^x dx = e^x + C$

4. $\int 5^x dx = \frac{1}{\ln 5} 5^x + C$

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

6. $\int \cos x dx = \sin x + C$

7. $\int \sec^2 x dx = \tan x + C$

8. $\int \sec x \tan x dx = \sec x + C$

9. $\int \csc^2 x dx = -\cot x + C$

10. $\int \csc x \cot x dx = -\csc x + C$

11. $\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + C$

12. $\int \frac{1}{1+x^2} dx = \arctan x + C$

13. NEW! $\int \frac{1}{x\sqrt{x^2-1}} dx = \operatorname{arcsec} x + C$ (provided arcsec x is defined to have the range $[0, \frac{\pi}{2}) \cup [\pi, \frac{3\pi}{2})$)

14. NEW! $\int \sec x dx = \ln|\sec x + \tan x| + C$

Because: $\int \sec x dx = \int \frac{\sec x(\sec x + \tan x)}{\sec x + \tan x} dx = \int \frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x} dx$

$\begin{cases} u = \sec x + \tan x \\ du = (\sec x \tan x + \sec^2 x) dx \end{cases}$

$= \int \frac{du}{u} = \ln|u| + C = \ln|\sec x + \tan x| + C$