Derivatives and Integral Formulas from Chapter 7

- If f is a one-to-one differentiable function with inverse function f^{-1} and $f'(f^{-1}(a)) \neq 0$, then the inverse function is differentiable at a and $(f^{-1})'(a) = \dfrac{1}{f'(f^{-1}(a))}$.
- $\dfrac{d}{dx}(e^x) = e^x$
- $\dfrac{d}{dx}(e^{f(x)}) = e^{f(x)} \cdot f'(x)$
- $\dfrac{d}{dx}(\ln x) = \dfrac{1}{x}$
- $\dfrac{d}{dx}(\ln f(x)) = \dfrac{f'(x)}{f(x)}$
- $\dfrac{d}{dx}(\ln |x|) = \dfrac{1}{x}$
- $\dfrac{d}{dx}(\log_a x) = \dfrac{1}{x \ln a}$
- $\dfrac{d}{dx}(a^x) = a^x \ln a$
- $\dfrac{d}{dx}(\sin^{-1} x) = \dfrac{1}{\sqrt{1-x^2}}$
- $\dfrac{d}{dx}(\sin^{-1} f(x)) = \dfrac{f'(x)}{\sqrt{1-[f(x)]^2}}$
- $\dfrac{d}{dx}(\cos^{-1} f(x)) = \dfrac{-f'(x)}{\sqrt{1-[f(x)]^2}}$
- $\dfrac{d}{dx}(\tan^{-1} x) = \dfrac{1}{1+x^2}$
- $\dfrac{d}{dx}(\tan^{-1} f(x)) = \dfrac{f'(x)}{1+[f(x)]^2}$
- $\dfrac{d}{dx}(\cot^{-1} f(x)) = \dfrac{-f'(x)}{1+[f(x)]^2}$
- $\dfrac{d}{dx}(\sec^{-1} x) = \dfrac{1}{x\sqrt{x^2-1}}$
- $\dfrac{d}{dx}(\sec^{-1} f(x)) = \dfrac{f'(x)}{f(x)\sqrt{[f(x)]^2-1}}$

- $\dfrac{d}{dx}(\csc^{-1} f(x)) = \dfrac{-f'(x)}{f(x)\sqrt{[f(x)]^2 - 1}}$
- $\displaystyle\int e^x \ dx = e^x + C$
- $\displaystyle\int \frac{1}{x} \ dx = \ln|x| + C$
- $\displaystyle\int \tan x \ dx = \ln|\sec x| + C$
- $\displaystyle\int a^x \ dx = \frac{a^x}{\ln a} + C$
- $\displaystyle\int \frac{1}{\sqrt{1 - x^2}} \ dx = \sin^{-1} x + C$
- $\displaystyle\int \frac{1}{\sqrt{a^2 - x^2}} \ dx = \sin^{-1} \frac{x}{a} + C$
- $\displaystyle\int \frac{1}{x^2 + 1} \ dx = \tan^{-1} x + C$
- $\displaystyle\int \frac{1}{x^2 + a^2} \ dx = \frac{1}{a} \tan^{-1} \frac{x}{a} + C$
- $\displaystyle\int \frac{1}{x\sqrt{x^2 - 1}} \ dx = \sec^{-1} x + C$