Study guide for Midterm 01

Review the study guides for quiz 01 - quiz 03. They are all relevant for midterm 01.

1. Section 3.2: Study the definition of derivative, one-sided derivatives, and relation between differentiability and continuity (Theorem 1 and proof).

2. Section 3.3: Study derivative product rule, derivative quotient rule and applications such as
$$\frac{d^n}{dx^n}\big(f(x)g(x)\big) =?, \qquad \frac{d}{dx}\big(f_1(x)f_2(x)\cdots f_n(x)\big) =?$$
and derivative of determinants, etc.

3. Section 3.5: Review the definitions and algebraic identities of trigonometric functions listed in page 1-2 of Lecture 07. Study the derivation of $\frac{d}{dx}\sin x$, $\frac{d}{dx}\cos x$ and memorize the derivatives of all six trigonometric functions.

4. Section 3.6: Practice on derivative of composite functions: $\frac{d}{dx}f_1(f_2(\cdots f_n(x)))$ where the functions $f_1, f_2, \cdots f_n$ are elementary functions such as polynomials, trigonometric functions, exponential functions or their combinations.

5. Section 3.7: Study how to find derivative of a function through implicit differentiation. Also study higher order derivatives. In other words, how to find $\frac{d^n}{dx^n}f(x)$, when the function $y = f(x)$ is defined implicitly through $\{(x,y)|F(x,y) = 0\}$ with a given function F.