Things to know for exam 2

(1) Derivative rules
- $\frac{d}{dx}c = 0$
- $\frac{d}{dx}u^n = nu^{n-1}\frac{du}{dx}$
- $\frac{d}{dx}cf(x) = c\frac{d}{dx}f(x)$
- $\frac{d}{dx}(f(x) + g(x)) = \frac{d}{dx}f(x) + \frac{d}{dx}g(x)$
- $\frac{d}{dx}(f(x) - g(x)) = \frac{d}{dx}f(x) - \frac{d}{dx}g(x)$
- $\frac{d}{dx}(f(x) * g(x)) = f(x)g'(x) + f'(x)g(x)$
- $\frac{d}{dx}e^u = e^u\frac{du}{dx}$
- $\frac{d}{dx}\frac{f(x)}{g(x)} = \frac{g(x)f'(x)-f(x)g'(x)}{(g(x))^2}$
- $\frac{d}{dx}\sin u = \cos u\frac{du}{dx}$
- $\frac{d}{dx}\cos u = -\sin u\frac{du}{dx}$
- $\frac{d}{dx}\tan u = \sec^2 u\frac{du}{dx}$
- $\frac{d}{dx}\csc u = -\csc u\cot u\frac{du}{dx}$
- $\frac{d}{dx}\sec u = \sec u\tan u\frac{du}{dx}$
- $\frac{d}{dx}\cot u = -\csc^2 u\frac{du}{dx}$
- $\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$
- $\frac{d}{dx}a^u = a^u(\ln a)\frac{du}{dx}$
- $\frac{d}{dx}\arcsin u = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx}$
- $\frac{d}{dx}\arccos u = -\frac{1}{\sqrt{1-u^2}}\frac{du}{dx}$
- $\frac{d}{dx}\arctan u = \frac{1}{1+u^2}\frac{du}{dx}$
- $\frac{d}{dx}\operatorname{arcsec} u = \frac{1}{u\sqrt{u^2-1}}\frac{du}{dx}$
- $\frac{d}{dx}\operatorname{arccsc} u = -\frac{1}{u\sqrt{u^2-1}}\frac{du}{dx}$
- $\frac{d}{dx}\operatorname{arccot} u = -\frac{1}{1+u^2}\frac{du}{dx}$
- $\frac{d}{dx}\log_a u = \frac{1}{u\ln a}\frac{du}{dx}$

(2) $\lim_{\theta\to 0}\frac{\sin\theta}{\theta} = 1$
(3) $\lim_{\theta\to 0}\frac{\cos\theta-1}{\theta} = 0$
(4) How to do implicit differentiation.
(5) Applying the chain rule.
(6) Logarithmic differentiation.
(7) How to do related rates problems.
(8) Extreme value theorem (pg 275)
(9) Fermat's theorem (pg 276)
(10) Definition of a critical number (277)
(11) Closed interval method (278)
(12) Rolle's theorem (284)
(13) Mean Value Theorem (285)