The most important theory for Math 152

Definitions:
- definitions used for graphing: concave up/down, point of inflection, vertical and horizontal asymptote, vertical tangent and cusp
- definitions used for integration: partition, upper sum, lower sum
- the definite integral
- a function is integrable if...
- Riemann sum
- the indefinite integral
- one-to-one
- inverse
- ln $x$
- the number $e$
- $e^x$ for $x$ real
- $x^r$ for $x > 0$, $r$ any real number

Theorems:
- inequalities involving upper sum, lower sum, integral and Riemann sum
- If $F(x) = \int_a^x f(t) \, dt$ where $f$ is continuous on $[a, b]$ then $F$ is continuous on $[a, b]$, differentiable on $(a, b)$ and $F'(x) = f(x)$ for all $x \in (a, b)$. (you do not need to know the proof of this for the final exam)
- the Fundamental Theorem of Integral Calculus
- linearity of the integral
- mean value theorem for integrals
- if $f$ is one-to-one then it has an inverse
- if $f$ is continuous then $f^{-1}$ is continuous, and if $f$ is differentiable then $f^{-1}$ is differentiable at $b = f(a)$ provided $f'(a) \neq 0$
- properties of $\ln x$ and $e^x$, including differentiation and integration