Theorems whose proofs you should know for the Final Exam

1. If $\{a_n\} \to A$ and $\{b_n\} \to B$ then $\{a_n \cdot b_n\} \to A \cdot B$

2. A Cauchy sequence is bounded.

3. Every bounded sequence has a convergent subsequence

4. If f is continuous at x_0 and g is continuous at $f(x_0)$, then $g \circ f$ is continuous at x_0

5. Bolzano's Thm - If $f: [a,b] \to \mathbb{R}$ is continuous, $f(a) < 0$ and $f(b) > 0$, then $\exists\ c \in (a,b)$ st. $f(c) = 0$.

6. E.V.T. If $f: [a,b] \to \mathbb{R}$ is cont. then $\exists\ c, d \in [a,b]$ st $f(c) \le f(x) \le f(d)\ \forall x \in [a,b]$

7. Critical points theorem - Suppose $f: [a,b] \to \mathbb{R}$ has a relative (local) max or min at $c \in (a,b)$ and that f is diff at c. Then $f'(x_0) = 0$.

8. MVT (assuming Rolle's thm) If $f: [a,b] \to \mathbb{R}$ is cont and f is diff on (a,b) then $\exists\ c \in (a,b)$ st

$$f'(c) = \frac{f(b) - f(a)}{b-a}$$

9. If $f: [a,b] \to \mathbb{R}$ is cont, then f is integrable.