Chapter 4

Continuity

4.1 Notes

11/8:

- Consider a function $f : X \to Y$ whose domain and codomain are, respectively, the metric spaces (X, d_X) and (Y, d_Y).
- **Limit** (of f at p): A point $q \in Y$ such that for all $\epsilon > 0$, there exists δ such that $d_X(x, p) < \delta$ implies $d_Y(q, f(x)) < \epsilon$, where p is a limit point of X (otherwise, $x \not\to p$).
- **Continuous** (function f at p): A function f such that $\lim_{x \to p} f(x) = f(p)$.
- f is continuous on X if it is continuous at every $p \in X$.
- **Uniformly continuous** (function f): A function f such that for every $\epsilon > 0$, there exists a $\delta > 0$ such that $d_X(x, y) < \delta$ implies $d_Y(f(x), f(y)) < \epsilon$ for all $x, y \in X$.