Math 409-502

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Continuous functions

The function f is continuous at the point a if for every $\epsilon > 0$ there exists $\delta > 0$ such that $|f(x) - f(a)| < \epsilon$ whenever $|x - a| < \delta$.

The sum and product of continuous functions are continuous; so is the quotient if the denominator is not zero.

The composition of two continuous functions is continuous.

Limits of functions

$\lim_{x \to a} f(x) = L$ means that for every $\epsilon > 0$ there exists $\delta > 0$ such that $|f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$.

$\lim_{x \to \infty} f(x) = L$ means that for every $\epsilon > 0$ there exists N such that $|f(x) - L| < \epsilon$ whenever $x > N$.

$\lim_{x \to a} f(x) = \infty$ means that for every N there exists $\delta > 0$ such that $f(x) > N$ whenever $0 < |x - a| < \delta$.

$\lim_{x \to \infty} f(x) = \infty$ means that for every N there exists M such that $f(x) > N$ whenever $x > M$.

Homework

1. Read sections 11.3, 11.4, and 11.5, pages 158–167.
2. Do exercises 11.4/1 and 11.5/1 on page 168.