MATH 153

Today

1. WeBWorK/Questions
2. 8.1 Sequences

Goals:

1. 8.7 Taylor polynomials (Understand the extension of tangent line approximations to higher-order polynomial approximations)

Where is today's material used?

1. Many physical phenomena modeled with complicated functions are approximated with polynomials.
2. Physics: period of a simple pendulum, electric dipoles.
3. Chemistry: Lennard-Jones potential.

8.7 Taylor Polynomials

1. In Calc I, we approximate functions with tangent lines. We will extend that idea to "tangent parabolas," "tangent cubics," etc.
2. **Definition:** Let f be a function with n continuous derivatives in an open interval containing a. The **nth-degree Taylor polynomial of f at a** is the polynomial

$$T_n(x) = f(a) + \frac{f'(a)}{1!}(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \ldots + \frac{f^{(n)}(a)}{n!}(x-a)^n.$$

3. Note that the linearization of f at a is $T_1(x)$. It's graph is the tangent line to f at $x = a$.

Next Time

1. 8.1: Sequences.
2. **Turn in** 8.7 WeBWorK 01: 3, 5