MATH 153

Today

1. WeBWorK/Questions
2. 8.4 The Ratio Test and the Root Test

Goals:

1. 8.4 The Ratio Test and the Root Test (Understand the Ratio Test and the root test and the similarities between them)

Where is today's material used?

1. Series appear frequently in chemistry and physics as a means of approximating functions.

8.4 The Ratio Test and the Root Test

1. **Theorem (Ratio Test):** Assume $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| = L$ (allowing $L = \infty$).
   (a) If $L < 1$, then $\sum_{n=1}^{\infty} a_n$ is absolutely convergent.
   (b) If $L > 1$, then $\sum_{n=1}^{\infty} a_n$ is divergent.
   (c) If $L = 1$, then the test is inconclusive.
2. **Theorem (Root Test):** Assume $\lim_{n\to\infty} \sqrt[n]{|a_n|} = L$ (allowing $L = \infty$).
   (a) If $L < 1$, then $\sum_{n=1}^{\infty} a_n$ is absolutely convergent.
   (b) If $L > 1$, then $\sum_{n=1}^{\infty} a_n$ is divergent.

(c) If $L = 1$, then the test is inconclusive.

3. Examples: 8.4, p. 463: 3-8, 9-12, 13-16, 19-40

Next Time

1. Exam!
2. **Turn in** 8.4 WeBWorK 10: 4, 11, 12