MATH 1B WORKSHEET 8

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All problems below are taken from Stewart's *Calculus: Early Transcendentals (8th edition)*. An electronic copy of this worksheet is available at `https://markmacerato.github.io`.

1. Absolute vs Conditional Convergence

1.1. **Problems 2 and 5.** One of the following two series is absolutely convergent and one is conditionally convergent. Which is which?

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{5n+1} \qquad \sum_{n=1}^{\infty} \frac{\sin(n)}{2^n}$$

2. Ratio Test

2.1. **Problem 18.** The last homework asked you to show that the sum

$$\sum_{n=1}^{\infty} \frac{n!}{n^n}$$

converges. This time, show that the sum converges using the Ratio Test instead.

2.2. **Problems 14 and 15.** Use the Ratio Test to show that the following series do *not* converge.

$$\sum_{n=1}^{\infty} \frac{n!}{100^n} \qquad \sum_{n=1}^{\infty} \frac{n\pi^n}{(-3)^{n-1}}$$

3. Root Test

3.1. **Problems 27 and 28.** One of the following series converges and the other does not. Use the Root Test to tell which is which.

$$\sum_{n=2}^{\infty} \frac{(-1)^{n-1}}{(\ln n)^n} \qquad \sum_{n=1}^{\infty} \left(\frac{-2n}{n+1}\right)^{5n}.$$

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