MATH31B: Week 9

TA: Ben Szczesny Last updated: 2018/05/28

Question 1. For which of the following series does the alternating series test apply?

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{\cos(n\pi)}{n}$

(b) $\displaystyle\sum_{n=1}^{\infty} (-1)^n \sqrt{n}$

(c) $\displaystyle\frac{1}{2} - \frac{1}{4} + \frac{1}{3} - \frac{1}{8} + \cdots + \left(\frac{1}{n} - \frac{1}{2^n}\right) + \cdots$

(d) $\displaystyle\sum_{n=1}^{\infty} (-1)^n n^2 e^{-x^3/3}$

Question 2. Determine whether the series in Question 1 converge conditionally, absolutely or diverges.

Question 3. Use either the root or ratio test to determine convergence of the following.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{e^n}{n^n}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{n^9}$

(c) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{n}{2n+5}\right)^n$

(d) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2^n + 1}$