

Problem Set 29

1) What is the Alternating Series Test? Rederive the test in the context of the alternating harmonic series.

2) What is the relationship between absolute convergence, conditional convergence, and convergence? Give examples of series that are of each kind.

3) Which of the following series converge and which diverge? Explain your answers.

a) (10.6.2)

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^{3/2}}$$

b) (10.6.12)

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

c) (10.6.20)

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

d) (10.6.24)

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

e) (10.6.32)

$$\sum_{n=1}^{\infty} (-5)^{-n}$$

f) (10.6.36)

$$\sum_{n=1}^{\infty} \frac{\cos n\pi}{n}$$