Brief solutions to Quiz 2

Mar 07, 2023:
Average = 68 pts.

1. (20 pts + 20 pts) (**Average** = 10.00 pts + 14.67 pts) Write down the statement of The Integral Test (need not prove it) and use it to derive the convergence/divergence of $\sum_{n=1}^{\infty} n^{-3}$. For this problem, you need to show detail computation of the corresponding improper integral (as a limit).

   Ans:

   The Integral Test: See textbook (Section 10.3, Theorem 9) or page 2 of Lecture 03.

   Convergence/divergence of the p-series: See textbook (Section 10.3, Example 3) or Lecture 03.

2. (60 pts) (**Average** = 14.00 pts + 15.83 pts + 13.50 pts) Determine the convergence/divergence of

$$\text{(a)}: \sum_{n=2}^{\infty} \frac{1}{\sqrt{n}\ln n} \quad \text{(b)}: \sum_{n=1}^{\infty} n\sin\left(\frac{1}{n}\right) \quad \text{(c)}: \sum_{n=1}^{\infty} \ln\left(1+\frac{1}{n^2}\right)$$

   For this problem, you may use the convergence/divergence of elementary series such as geometric series, p series without proving it again.

   Ans:

   (a): See homework 02 solution: Section 10.4, problem 29.

   (b): See homework 02 solution: Section 10.3, problem 33.

   (c): See homework 02 solution: Section 10.3, problem 16.