Homework 1

1. (20 points) Show that harmonic series diverge

2. (20 points) Prove this part of Comparison Test : If for each term V_n they satisfy $0 \leqslant b_n \leqslant V_n$, where b_n form a divergent series, then $\sum_n V_n$ is also divergent.

3. (20 points) Show that Eq. 1.6 is equiivalent to original D' Alambert Ratio test

4. (30 points) Prove Cauchy (or Maclaurin) Integral Test

5. (20) poits Prove that $\zeta(2) = \sum_{n=1}^{\infty} n^{-2}$ is converging

6. (10 points) Show that Harmonic series diverge logarithmically

7. (40 points) Prove the Kummer' s theorem and show that Gauss' test is its application.

8. (40 points) Excersize 1.1.5 a,b,c,d

9. (30 points) Excersize 1.1.6, a,c,d