Math 1221: Recitation 7 (T)

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(1) Solve the following.

    (a) Find the a_5 of the following sequence.
$$a_0 = 2, a_2 = 1, \quad a_n = \frac{1}{a_{n-1}} + a_{n-2}$$

    (b) Find the following limit
$$\lim_{n \to \infty} \frac{n^3}{5^n}$$

    (c) Find the following limit using Squeeze theorem
$$\lim_{n \to \infty} \frac{5n!}{n^n}$$

(2) Solve the following questions. **(Do any two of them)**.

    (a) Determine whether the series converges or diverges
$$\sum_{n=0}^{\infty} \frac{99^n}{100^{n+1}}$$

(b) Show that the following series diverges. *Hint: It is a telescoping sum.*

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

(c) Use the integral test to evaluate whether the sum converges or diverges.

$$\sum_{n=1}^{\infty}\frac{7n}{1+n^4}$$

(3) **(Bonus)** Solve any one of them.

(a) Find the limit of

$$a_n = \frac{\sqrt{5n^4 + 3n^2 + 2}}{6n^2 + 2}$$

(b) Use estimate $R_N \leq \int_N^{\infty} f(t)dt$ to find a bound where $R_N = \sum_{n=1}^{\infty} a_n - \sum_{n=1}^{N} a_n$ where

$$a_n = \sum_{n=1}^{1000}\frac{7}{n^2}$$

(c) Determine whether the series converges or diverges

$$\sum_{n=2}^{\infty}\frac{8}{n\sqrt{\ln n}}$$