Quiz 15

Please answer the following questions in complete sentences in a clearly prepared manuscript. (No credits for the answer without nessary explaination.)

Problem 0: Quiz checklist

Please write the section number, your name and special number on the **back**.

The comparison tests & Alternating Series

Determine whether the series is convergent or divergent?
You must state clearly what test you are using and verify
that the conditions of the test are satisfied.

(a) $\sum\limits_{n=1}^{\infty} \dfrac{n+3}{3n^3 - n - 10}$,

solution:
Consider series $\sum\limits_{n=1}^{\infty} b_n = \sum\limits_{n=1}^{\infty} \dfrac{1}{3n^2}$ Since

$$\frac{n+3}{3n^3 - n - 10} \sim \frac{1}{3n^2},$$

by limit comparison test, we have series converges. (b) $\sum\limits_{n=1}^{\infty} \dfrac{n+1}{3n^2 + 5}$,

solution:
Consider series $\sum\limits_{n=1}^{\infty} b_n = \sum\limits_{n=1}^{\infty} \dfrac{1}{3n}$ Since

$$\frac{n+3}{3n^3 - n - 10} \sim \frac{1}{3n},$$

by limit comparison test, we have series diverges. (c) $\sum\limits_{n=1}^{\infty} \dfrac{(-1)^n}{\sqrt{n+4}}$,

solution:
(i) $\lim b_n = \lim \dfrac{1}{\sqrt{n+4}} = 0$ (ii) $b_n > b_{n+1}$ By alternating series test, it coverges.

(d) $\sum\limits_{n=1}^{\infty} (-1)^n \dfrac{n}{3n+1}$

solution:
Since $\lim \dfrac{n}{3n+1} = \dfrac{1}{3}$, by test for divegence, it diverges.