Name:________________________

Notesheet. Section 11.4 Part 2: Series with Positive Terms

Math 1220

Challenge 1. Determine the convergence of the following series:

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{5n-1}{2n^3+4n+3}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{9+\sin(n)}{n^3}$

Other series to try at home:

$$\sum_{n=1}^{\infty} \frac{9+\sin(n)}{n}, \sum_{n=2}^{\infty} \frac{\pi^n}{e^n-1}, \sum_{n=2}^{\infty} \frac{1}{2\sqrt{n^2-1}}, \sum_{n=1}^{\infty} \frac{1}{n^n} \text{ (Hint: } n^n \geq n^2\text{).}$$

Challenge 2. True or False?

(a) We can apply the comparison test on $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$

(b) If $\sum a_n, \sum b_n$, and $\sum c_n$ are all series with positive terms, $\sum a_n$ is convergent, and $b_n + c_n \le a_n$ for all n, then $\sum b_n$ and $\sum c_n$ are convergent.

(c) If $\sum a_n, \sum b_n$, and $\sum c_n$ are all series with positive terms, $\sum a_n$ is divergent and $b_n + c_n \ge a_n$ for all n, then $\sum b_n$ and $\sum c_n$ are divergent.

Remark 3. *A heuristic approach to solving series convergence problems in this class goes as follows*