Ν	ame:

Notesheet. Section 11.4 Part 2: Series with Positive Terms Math 1220

Challenge 1. Determine the convergence of the following series:

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

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

Other series to try at home:

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

Challenge 2. True or False?

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

- (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

Zan converges? → (geon series Žarn? <u>Yes</u>) telescoping series? <u>Yes</u> (P-series Ž<u>n</u>] <u>Yes</u> Ino Test For divergence applies Yes, I no No Za, similar to geom or p-series Kes,