Math 1B Final Review 3

April 21, 2019

Topics to Review:

- Telescoping series, geometric series

- Nth term test (also called divergence test)

- p test

- Test for nonnegative series (Direct Comparison Test, Limit Comparison Test, Integral Test)

- Absolute vs. conditional convergence

- Alternating series test

- Ratio test/root test

Question 1: Nonnegative series

Determine if the following series converge or diverge.

$$\sum_{n=0}^{\infty} \frac{\sqrt{n}+2}{n^2+3n-2}$$

$$\sum_{n=1}^{\infty} \arctan\left(\cos\left(\frac{1}{n}\right)\right)$$

$$\sum_{n=0}^{\infty} \frac{n^2}{e^n}$$

$$\sum_{n=1}^{\infty} n^2 \tan\left(\frac{1}{n^4}\right)$$

$$\sum_{n=1}^{\infty} \frac{2^n}{7^n-6^n}$$

Question 2

Show that the following series are convergent. Then, find the values of the following convergent series.

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

$$\sum_{n=0}^{\infty} \frac{(-1)^{n-1} 4^n}{5^n}$$

Question 3

Do the following series converge absolutely, converge conditionally, or diverge?

$$\sum_{n=1}^{\infty} (-1)^n \sec\left(\frac{1}{n}\right)$$

$$\sum_{n=1}^{\infty} \frac{(2n)!}{1 \cdot 4 \cdot 7 \cdots (3n-2)}$$

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

$$\sum_{n=1}^{\infty} (-1)^{n^2} \left(\frac{2n}{n + \sqrt{n}}\right)^n$$

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1} \ln(n)}{\sqrt{n}}$$

$$\sum_{n=1}^{\infty} \frac{(-1)^n n^n}{2^n (n+1)!}$$