

Math 2254 Test # 3

1. Write out the first 5 terms of the sequences defined as follows. Either fraction or decimal form is OK. Then determine whether the sequences converge or diverge. If the sequence converges, what does it converge to?

a) $a_n = \frac{3n+20}{2n+1}$

b) $b_n = \frac{5n}{n^2+1}$

For all problems involving series, you must give persuasive evidence that your answer is correct. If you use a comparison test, say what you're comparing to. If using the integral test, you must do the integral.

2. Determine whether each series diverges, or whether it converges conditionally or absolutely.

a) $\sum_{n=1}^{\infty} (-1)^n \frac{5n^2}{3n^2+2n}$ b) $\sum_{n=1}^{\infty} (-1)^n \frac{4n^3+3n}{2n^6+5}$ c) $\sum_{n=1}^{\infty} (-1)^n \frac{2n^3+2}{5n^4+5n}$

3. Determine whether each series is convergent or divergent. If convergent, find the sum.

a) $3 - \frac{6}{5} + \frac{12}{25} - \frac{24}{125} + \frac{48}{625} - \dots$ b) $\sum_{n=1}^{\infty} \left(\frac{3}{4}\right)^n$ c) $\sum_{n=2}^{\infty} (-1.5)^n$

4. Determine convergence or divergence.

a) $\sum_{n=1}^{\infty} \frac{n^{10}+5}{6^n}$ b) $\sum_{n=1}^{\infty} \frac{2n+3}{5n+1}$ c) $\sum_{n=1}^{\infty} \frac{5n^2}{\sqrt{n^3+7n}}$ d) $\sum_{n=1}^{\infty} \frac{(-3)^n}{2n!}$

e) $\sum_{n=1}^{\infty} \frac{\ln n}{5n^4}$ f) $\sum_{n=2}^{\infty} \frac{n!}{n^4 - n^2}$

5. Express the number 0.3636363636... as a geometric series, and then use that geometric series to find a fraction that is equal to this number.