

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has six (6) pages, including this one.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or calculators may be used on this test.

Page	Max. points	Your points
2	20	
3	20	
4	25	
5	20	
6	15	
Total	100	

$$x_n =$$

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Problem 3 (20 pts). Determine whether the series converge, and if so find their sum:

(a) $\sum_{n=1}^{\infty} \left(-\frac{3}{4}\right)^{n-1}$

$$\sum_{n=1}^{\infty} \left(-\frac{3}{4}\right)^{n-1} =$$

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

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

Problem 4 (5 pts). Apply the **zero-limit test** (also known as the divergence test) and state what it tells you about the series.

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

Problem 5 (10 pts). Use the **integral test** to determine whether the series $\sum_{n=1}^{\infty} \frac{1}{5n+2}$ converges.

Problem 6 (10 pts). Use the **ratio test** to determine whether the series $\sum_{n=1}^{\infty} \frac{4^n}{n^2}$ converges. If the test is inconclusive, then say so.

Problem 7 (10 pts). Use the **root test** to determine whether the series $\sum_{n=1}^{\infty} \left(\frac{3n+2}{2n-1} \right)^n$ converges. If the test is inconclusive, then say so.

Problem 8 (10 pts). Classify the series $\sum_{n=1}^{\infty} (-1)^n \frac{4n^2+1}{n^3+2}$ as absolutely convergent, convergent or divergent.

Problem 9 (15 pts). Find the radius of convergence and interval of convergence of the series

$$\sum_{n=0}^{\infty} \frac{(-3)^n x^n}{\sqrt{n+1}}$$