

MAT 222 - 001
Fall 2007
Review for Test One
Show all work.

On the integration problems, show the details of each step.

1. $\int_2^{\infty} \frac{1}{\sqrt[3]{x-1}} dx.$

2. Use Simpson's rule with $n = 8$ to approximate $\int_1^5 \sqrt[3]{1+\ln x} dx.$

3. Write the first five terms of the sequence

$$a_n = \frac{n^2 - n + 7}{2n^3 + n^2}$$

Determine whether the sequence converges or diverges. If it converges, find its limit.

Determine whether each of the following series converges or diverges. If the series is a convergent geometric series, find its sum. State the test you are using and show all details of the test. Always verify the conditions needed for the test to be valid.

$$4. \frac{1}{3} + \frac{2}{9} + \frac{4}{27} + \frac{8}{81} + \dots$$

$$5. \sum_{k=1}^{\infty} \frac{\sqrt{k}}{\ln(k+1)}.$$

$$6. \sum_{k=1}^{\infty} \left[\left(\frac{7}{11} \right)^k - \left(\frac{3}{5} \right)^k \right].$$

$$7. \sum_{k=1}^{\infty} \frac{1}{(k+1)^3}.$$

$$8. \sum_{k=1}^{\infty} \frac{1}{k(k+1)}.$$

$$9. \sum_{k=1}^{\infty} \frac{1}{17k-13}$$

$$10. \sum_{k=1}^{\infty} \frac{(-1)^k k}{k+1}.$$