3. Do WebAssign 9.2. Remember that the WebAssign will be reopened three days before Exam III for you to review the problems. You will be allowed to improve your score by a maximum or three points. Additional attempts will not be given.

---

4. Decide whether the following series are geometric series or not. If yes, give the first term and the ratio between terms. If not, explain why not.

$$1 + x + 2x^2 + 3x^3 + 4x^4 + \dots$$

$$1 - x + x^2 - x^3 + x^4 - \dots$$

---

5. Find the sum of the infinite geometric series

$$36 + 12 + 4 + \frac{4}{3} + \frac{4}{9} + \cdots$$

6. Find the sum of the series. For what values of the variable does the series converge to this sum?

$$2 - 4z + 8z^2 - 16z^3 + \dots$$

---

7. Explain why the series is not geometric.

$$\frac{2}{2} + \frac{3}{4} + \frac{4}{8} + \frac{5}{16} + \frac{6}{32} + \cdots$$

Find an expression for the n^{th} term of the series.

Describe what happens to the limit $\lim_{n\to\infty} |\, a_{n+1}/a_n \,|$.

This suggests that the series *almost* a geometric series. Do you think it will converge or diverge?

Convergence of Series

Section 9.3
October 20, 2016

Name:
Math 129 - 01

Understand	Know the definition of series convergence/divergence using limits of partial sums.
Understand	Know the Convergence Properties of Series (Theorem 9.2).
Apply	Apply the Integral Test to determine convergence/divergence of a given series.
Apply	By the Integral Test, the p-series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges if ______ and diverges if ______.
Synthesize	Use appropriate comparison to improper integrals to determine convergence/divergence of series.

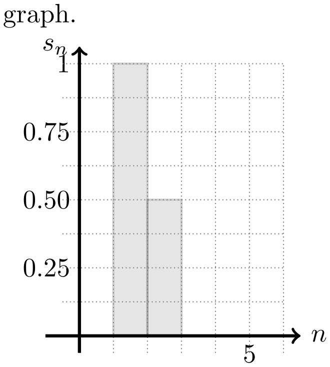
1. In this problem, we will investigate whether the series

$$\sum_{n=1}^{\infty} \frac{1}{n}$$

converges or diverges without evaluating the sum.

(a) Write out the first 6 terms of the sequence and plot them on the graph.

$s_1 = 1$
$s_2 = \frac{1}{2}$
$s_3 = \frac{1}{3}$
$s_4 = \frac{1}{4}$
$s_5 = \frac{1}{5}$
$s_6 = \frac{1}{6}$



(b) Plot $y = \frac{1}{x}$ and $y = \frac{1}{x+1}$ on the graph above.

(c) Insert the appropriate symbol ($\leq$, or $\geq$) below.

$$\sum_{n=1}^{\infty} \frac{1}{n} \quad \square \quad \int_1^{\infty} \frac{1}{x}\, dx$$

$$\sum_{n=1}^{\infty} \frac{1}{n} \quad \square \quad \int_1^{\infty} \frac{1}{x+1}\, dx$$

(d) Does the series converge or diverge? Explain your answer.

$$\sum_{n=1}^{\infty} \frac{1}{n}$$

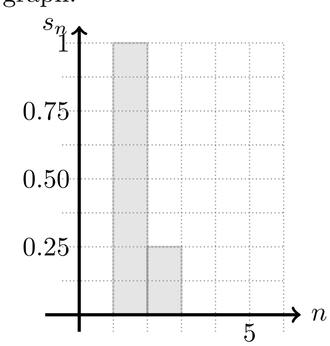
2. We now investigate whether the series

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

converges or diverges without evaluating the sum.

(a) Write out the first 6 terms of the sequence and plot them on the graph.

$s_1 = 1$
$s_2 = \frac{1}{4}$
$s_3 = \frac{1}{9}$
$s_4 =$
$s_5 =$
$s_6 =$



(b) Plot $y = \frac{1}{x^2}$ and $y = \frac{1}{(x+1)^2}$ on the graph above.

(c) Insert the appropriate symbol ($\leq$, or $\geq$) below.

$$\sum_{n=1}^{\infty} \frac{1}{n^2} \quad \square \quad \int_1^{\infty} \frac{1}{x^2}\, dx$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} \quad \square \quad \int_1^{\infty} \frac{1}{(x+1)^2}\, dx$$

(d) Does the series converge or diverge? Explain your answer.

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

Quiz (Leave this space blank)