# A Series of Questions (Lecture Assignment)

Complete this assignment and submit it to Gradescope by 4:00pm on your class day. You can print this sheet, or write on your own paper. Contact us if internet connections or other issues require alternate arrangements.

1. Write out the first few terms of the series $\sum_{n=0}^{\infty} ar^n$. How does it compare to $\sum_{n=1}^{\infty} ar^{n-1}$? For which values of $r$ will it converge?

$\sum ar^n = a + ar + ar^2 \rightarrow$ smaller than $\sum ar^{n-1}$; It'll converge for any $r < 1$

2. Problem 1 was an example of *reindexing*, where we rewrite a series using different values of the "indexing variable," (usually $n$, $i$, $j$ or $k$). Rewrite $\sum_{n=1}^{\infty} ar^{n-1}$ by reindexing as follows. *(Hint: by looking at the starting values you can figure out that $k = n + 2$ and $n = k - 2$.)*

$\sum_{n=1}^{\infty} ar^{n-1} = \sum_{k=3}^{\infty} ar^{k-3}$ $\qquad$ $\sum_{n=1}^{\infty} ar^{n-1} = \sum_{i=10}^{\infty} ar^{i-10}$

a, ar, ar² $\qquad$ a, ar, ar²

3. Determine which of the following series are the same (by reindexing) as $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$. Circle those which are equivalent.

$n_2 = n + 1$ $\qquad$ $i = n - 1$

$\sum_{k=3}^{\infty} \frac{1}{(k-2)(k-1)}$ $\qquad$ $\sum_{n=2}^{\infty} \frac{1}{n(n-1)}$ $\qquad$ $\sum_{i=0}^{\infty} \frac{1}{(i+1)(i+2)}$

**One-Minute Questions**: Write a sentence for each.

A. What's one mathematical question you have after watching the videos?

HOW TO SOLVE INCHWORM???

B. What's one interesting thing you learned from the book or videos?

I learned that math laws go "poof" regarding ∞.