Name Solutions

Math 141A	Spring 2014

Quiz Seven
April 30, 2014

DIRECTIONS: Allow yourself no more than 30 minutes to complete this quiz. **No calculators.** This quiz is given under conditions of the ***Luther College Honor Code***. You are expected to uphold the highest standards of academic integrity, and you are expected to demand the same from fellow students.

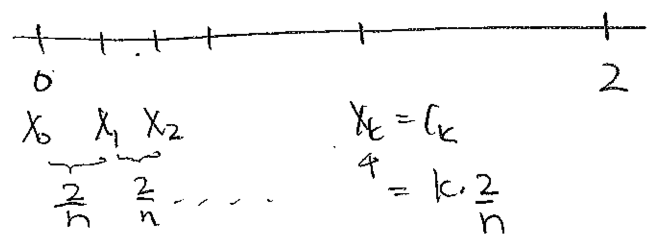
1. Express the following sums in sigma notation. 10 points

(a) $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}$ $= \sum_{k=2}^{5} \frac{1}{k} = \sum_{k=1}^{4} \frac{1}{k+1}$

(b) $1-4+9-16+25-36+49-64$ $= \sum_{k=1}^{8} (-1)^{k+1} k^2$

2. Find the formula for the Riemann sum $\left(\sum_{k=1}^{n} f(c_k)\Delta x_k\right)$ of $f(x)=\frac{1}{x}$ on the interval [0,2] by dividing the interval into n equal subintervals and using the right-hand endpoint for each c_k. 5 points

$\Delta x_k = \frac{2-0}{n} = \frac{2}{n}$



$c_k = k \cdot \frac{2}{n}$

$f(c_k) = \frac{n}{2k}$

$\sum_{k=1}^{n} f(c_k)\Delta x_k = \sum_{k=1}^{n} \frac{\cancel{n}}{2k} \cdot \frac{2}{\cancel{n}} = \boxed{\sum_{k=1}^{n} \frac{1}{k}}$

3. Express $\lim_{\|P\|\to 0} \sum_{k=1}^{n} \frac{1}{1-c_k}\Delta x_k$, where P is a partition of [2,3] as a definite integral. 5 points

$\lim_{\|P\|\to 0} \sum_{k=1}^{n} \frac{1}{1-c_k}\Delta x_k = \boxed{\int_2^3 \frac{1}{1-x}\,dx}$