

NAME: _____

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Worksheet week 1 - MAC 2312, Fall 2013

1. (5 pts) (Problem 62, section 5.4 textbook)

(a) Find a simple closed form for the sum $\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \dots + \frac{1}{n(n+1)}$

Hint: Check that $\frac{1}{k(k+1)} = \frac{1}{k} - \frac{1}{k+1}$ and, using this, observe that you get a telescopic sum .

(b) Use the result in part (a) to find

$$\lim_{n \rightarrow +\infty} \sum_{k=1}^n \frac{1}{k(k+1)}$$

2. (5 pts) (Problem 53 (a), section 5.4 textbook) Use the right-end point Riemann sum to show that the area under the graph of $f(x) = x^3$ and over the interval $[0, b]$ is $b^4/4$.