

# Problems for Lecture 6

February 3, 2015

1. Using the definition of a Cauchy sequence to prove that the sequence

$$\frac{1}{n(n+1)}$$

is a Cauchy sequence. Hint: explain why

$$\left| \frac{1}{m(m+1)} - \frac{1}{n(n+1)} \right| < \frac{2}{\min(m, n)}.$$

2. Using the definition of a Cauchy sequence to prove that the sequence

$$\frac{1}{2^n}$$

is a Cauchy sequence. Hint: apply a similar inequality to the one in Problem 1.

3. Using the definition of a Cauchy sequence to prove that if  $a_n$  and  $b_n$  are two Cauchy sequences then the sequence  $a_n + b_n$  is a Cauchy sequence.