MATH 1210 Summer 2013 Quiz 1

Surname: _____

Given Name: _____

Student ID: _____

1. Prove the following using induction. For all $n \geq 1$,

$$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \cdots + \frac{1}{n(n+1)} = 1 - \frac{1}{n+1}.$$

[8]

2. Turn the following sum into sigma notation

$$\frac{2 \cdot 3}{1 \cdot 4} + \frac{6 \cdot 7}{5 \cdot 8} + \frac{10 \cdot 11}{9 \cdot 12} + \cdots + \frac{398 \cdot 399}{397 \cdot 400}$$

[6]

3. Using the sums $\sum\limits_{i=1}^{n} i = \frac{n(n+1)}{2}$ and/or $\sum\limits_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$, find the sum of

$$\sum_{i=-6}^{3} [(i+6)^2 + 2(i+7)].$$

[6]