MA 310 — Homework #4

Due Monday, February 2, in class

Read Sections 2.1–2.2 of the text.

1. Prove that for all positive integers n,

$$\frac{1}{1\cdot 2}+\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}+\cdots+\frac{1}{n(n+1)}=\frac{n}{n+1}.$$

2. Solve Example 1.1.4 from the textbook.

3. Solve Problem 2.2.13 from the textbook.

4. Let a, b, c be integers satisfying $a^2+b^2=c^2$. Prove that abc must be even.

5. For n a positive integer consider an array of $2^n \times 2^n$ squares, with the upper right-hand square removed. Prove that this array can be tiled by "ells" consisting of three squares. In the figure below we show the array $n=2$, and one "ell".