Math 401/501, Fall 2018
Assignment 3, due Wednesday, September 12

Exercises to hand in:

1. Hammack, §12.2: 2, 10, 12.

2. Hammack, §12.4: 6.

3. Hammack, §12.5: 2, 4.

4. Hammack, §12.6: 6, 8, 10, 12.

On your own (i.e. do not hand these in for a grade):

1. Hammack, §12.1: 1, 3.

2. Hammack, §12.2: 1, 3, 5, 9, 11, 13.

3. Hammack, §12.4: 5, 7, 9.

4. Hammack, §12.5: 1, 3, 5.

5. Hammack, §12.6: 1, 5, 7, 9, 11.

6. Classify each function as injective, surjective, bijective, or none of these. If the function is bijective, write down an inverse function.

   (a) $f : \mathbb{N} \to \mathbb{N}$ defined by $f(n) = n + 3$

   (b) $f : \mathbb{Z} \to \mathbb{Z}$ defined by $f(n) = n - 5$

   (c) $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = x^3 - x$

   (d) $f : [3, \infty) \to [5, \infty)$ defined by $f(x) = (x - 3)^2 + 5$

   (e) $f : \mathbb{N} \to \mathbb{Q}$ defined by $f(n) = \frac{1}{n}$

   (f) $f : \mathbb{N} \times \mathbb{N} \to \mathbb{Q}_+$ defined by $f(m, n) = \frac{m}{n}$ with $\mathbb{Q}_+ := \{x \in \mathbb{Q} : x > 0\}$.

Reading: Hammack, Chapters 10 and 12. Ross §1.1, 1.2.