Homework 10

Math 302 (section 501), Fall 2016

This homework is due on Thursday, November 3.

0. *(This problem is not to be turned in.)*
   (a) Read Sections 5.2–5.3 and 8.1–8.2
   (b) (Practice Problems) Section 5.3 # 2, 6, 28, 32
   (c) (Practice Problems) Section 8.1 # 7, 11, 26, 27, 30, 31
   (d) (Practice Problems) Section 8.2 # 8, 11, 18, 20, 22, 36
1. Section 5.2 # 4, 8, 12
2. Section 5.3 # 8, 24, 26
3. Section 8.1 # 8, 12, 28
4. Section 8.2 # 26, 28
5. Let $f : \{0, 1, 2, \dots\} \to \mathbb{R}$ be a function defined recursively as follows: $f(0) := 0$ and
$$f(n+1) \ := \ 3f(n) + 7$$
   (a) Compute $f(1)$, $f(2)$, and $f(3)$.
   (b) Prove or disprove: f is one-to-one (injective).
   (c) Prove or disprove: f is onto (surjective).
   (d) Prove via mathematical induction that the values of f alternate between odd and even numbers. (Note: you need to show the basis step for two numbers, and you might need to do a proof by cases or give a similar argument).
6. Give a formula for the sequence $\{c_n\}$ given by $c_0 = 4$, $c_1 = 10$, and the recurrence $c_n = 6c_{n-1} - 8c_{n-2}$ for $n \geq 2$.