18.125 Homework 2
due Wed Feb 17 in class

1. (2 pts) Consider the map $\Phi : (0,1) \to \{1, 2, \ldots, 9\}$ defined as follows: $\Phi(x)$ is the maximal digit in the decimal representation of x (we fix the decimal representation that does not end with '999...'). For example,

$$\Phi(1/7) = \Phi(0.1428571428\ldots) = \Phi\big(0.(142857)\big) = 8.$$

Show that Φ is a measurable map, where $(0,1)$ is endowed with the Borel σ-algebra and $\{0, 1, \ldots, 9\}$ is endowed with the power set σ-algebra.

2. (2 pts) Do Exercise 2.1.16.

3. (2 pts) Do Exercise 2.1.19.

4. (2 pts) Do Exercise 2.1.22.

5. (2 pts) Do Exercise 2.1.26.