Math 181: Bijects and Partitions

Bijections Practice

1. Which of the three diagrams below represent functions?

2. Given the diagrams below, draw arrows turning $f$ into a function and $g$ into something that is not a function.

3. For each of the scenarios below, answer the following questions:
   - Is it a function?
   - Is it injective?
   - Is it surjective?
   - Is it bijective?

   (a) The map taking social security numbers to a citizen of the US.
   (b) The relationship between the $x$-coordinate and $y$-coordinate of a circle.
   (c) The map taking students to their permanent address.

4. For each of the following pairs of sets, state whether or not they are the same size. If they are, explain a bijection that can pair the elements of the sets.

   (a) $\{1, 2, 3, 4, 5\}$ and $\{10, 20, 30, 40, 50\}$
   (b) $\{10, 20, 30, 40, 50\}$ and $\{5, 15, 25, 35, 45\}$
   (c) Even numbers between 1 and 100 (inclusive) and odd numbers between 1 and 100 (inclusive).
   (d) Number of people in the world and number of human brains in the world.
   (e) Number of people in the world and number of fingers in the world.
   (f) Number of cars and number of drivers in a traffic jam.
   (g) Number of cars and number of passengers in a traffic jam.