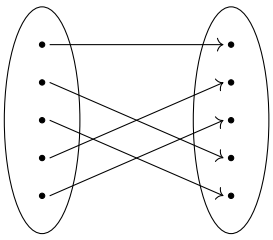
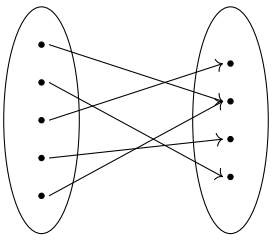
MATH 120A Prep: Functions

1. Each of the following is a visual representation of a function. It's domain and codomain are represented by points in a circle and the arrows between them describe how elements in the domain map to elements in the codomain. For each function determine whether or not it is a function, and if so whether it is injective, surjective, bijective, or none of the above.

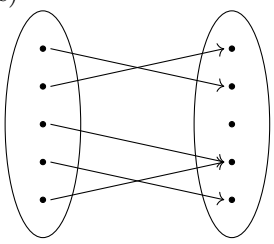
(a)



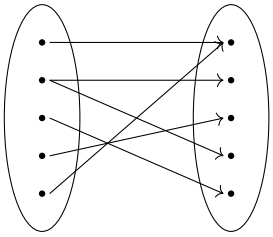
(b)



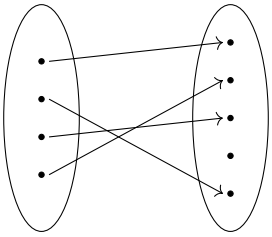
(c)



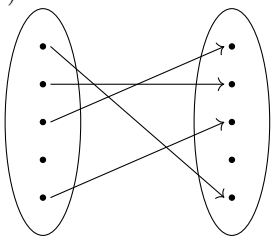
(d)



(e)



(f)



2. Determine whether the function $f : \mathbb{R} \to \mathbb{R}^2$ where $f(x) = (x^2, -2x)$ is injective and/or surjective.

3. Let $S = \{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 1\}$ and define a function $g : S \to [-1, 1]$ by $g(x, y) = x$. Determine whether this map is injective and/or surjective.