Examples on Injective, Surjective, and Bijective functions

Example 12.4.

Proposition: The function $f : \mathbb{R} - \{0\} \to \mathbb{R}$ defined by the formula $f(x) = \frac{1}{x} + 1$ is injective but not surjective.

Example 12.5.

Proposition: The function $f : \mathbb{R} - \{0\} \to \mathbb{R} - \{1\}$ is injective and surjective (hence bijective).

Example 12.6

Proposition: The function $g : \mathbb{Z} \times \mathbb{Z} \to \mathbb{Z} \times \mathbb{Z}$ defined by the formula $g(m, n) = (m + n, m + 2n)$ is both injective and surjective.

Example 12.15

Let \$A={A,B,C,D,E,F,G} and let $B = \{1, 2, 3, 4, 5, 6, 7\}$. How many functions are there from A to B? How many of these are injective? How many are surjective? How many are bijective?