

Functions

- 12.** Assume that the set A has exactly two elements and the set B has exactly three elements.
- Provide an example of a function $f : A \rightarrow B$. Define the inverse function. For the given example, determine if the inverse function $f^{-1} : B \rightarrow A$ exists, and if it does, find it. If it does not exist, explain why.
 - Provide an example of a function $g : B \rightarrow A$. For the given example, determine if the inverse function $g^{-1} : A \rightarrow B$ exists, and if it does, find it. If it does not exist, explain why.
 - How many functions map A to B ? How many of these functions are surjective? How many are injective? How many are bijective?

- 13.** Let \mathbb{R} be the set of real numbers, and let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by the rule

$$f(x) = 5x + 12.$$

Analyze the injectivity, surjectivity, and determine the inverse function $f^{-1}(x)$.

- 14.** Let $f : \mathbb{Z} \rightarrow \mathbb{Z}$ be a function defined by the rule

$$f(x) = x^2.$$

Analyze the injectivity, surjectivity, and bijectivity of the function f .

- 15.** Find an example of:

- An injective function $f : \mathbb{N} \rightarrow \mathbb{N}$ that is not surjective.
- A function $f : \mathbb{N} \rightarrow \mathbb{N}$ that is surjective but not injective.

Absolute Value

- 16.** Solve the inequality

$$\frac{|x + 1|}{-x^2 - 2x + 15} > 0.$$

- 17.** Solve the inequality

$$x^2 - 14 < |x + 2|.$$

- 18.** Solve the inequality

$$\left| \frac{x + 2}{x - 1} \right| > 2.$$

- 19.** Solve the inequality in the set of real numbers \mathbb{R} :

$$\sqrt{x^2 - 1} \leq \sqrt{|x - 1|}.$$

Write the solution in terms of intervals.

- 20.** Solve the inequality in the set of real numbers \mathbb{R} :

$$\sqrt{x^2 - 2x - 1} \leq \sqrt{|x - 1|}.$$

Write the solution in terms of intervals.

All above math problems are taken from the following website:

<https://osebje.famnit.upr.si/~penjic/teaching.html>.

THE READER CAN FIND ALL SOLUTIONS TO THE GIVEN PROBLEMS ON THE SAME PAGE.