Math 2001 - Writing project 4

First draft due November 30 (midnight), final draft December 4, 2020

The following **writing project** will be graded on clarity and correctness and should be typed in LaTeX.

Problem. Let $k, n \in \mathbb{N}$. How many

(1) functions,
(2) injective functions,
(3) surjective functions,
(4) bijective functions,

are there from $\{1, \ldots, k\}$ to $\{1, \ldots, n\}$?

Your write up should include the following:

(1) A section describing the problem with definitions of injective, surjective, bijective functions.
(2) A theorem stating the answers to the questions above.
(3) A proof of the theorem.
Hint: Recall the formulas for counting lists with/without repetitions and permutations for counting injective, bijective functions. For surjective functions use inclusion-exclusion.
(4) Give precise arguments for all your statements.