

QUIZ 9 FOR M325K

Name: _____
UT EID: _____

You may use a calculator otherwise you may give the solutions using factorials.

(1) Prove that

$$1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$$

by induction on n . You may take the base case to be $n = 1$.

(2) Give the 3 properties that a relation R on a set X must satisfy for R to be an *equivalence relation*.

(3) For each of the following functions say whether it is one-to-one, onto, or a bijection. If it is a bijection give a formula for its inverse.

(a) $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 2x$.

(b) $f : \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $f(x) = 2x$. (\mathbb{Z} means integers)

(c) $f : \mathbb{Z} \rightarrow \{0, 1, 2, 3, 4\}$ defined by $f(x)$ is the remainder after x is divided by 5.