

MATH 220.201 CLASS 18 QUESTIONS

1. For each of the following pairs of sets A, B , determine whether there are functions from A to B which are one-to-one (injective), onto (surjective), or both (bijective). Do the same with functions from B to A .

(a) $A = \{1, 2, 3, 4, 5\}$ and $B = \{6, 7, 8, 9\}$.

(b) $A = \mathbb{N} = \{1, 2, 3, \dots\}$ and $B = \{2n : n \in \mathbb{N}\} = \{2, 4, 6, 8, \dots\}$.

(c) $A = \mathbb{N}$ and $B = \{a + b\sqrt{2} : a \in \mathbb{N}, b \in \{0, 1, 2\}\}$.

(d) $A = \mathbb{N}$ and $B = \mathbb{Z} = \{\dots, -2, -1, 0, 1, 2, \dots\}$.

(e) $A = \mathbb{N}$, $B = \{2, 3, 5, 7, 11, \dots\}$ is the set of prime numbers.

2. Can you come up with a rigorous definition of what it means for a set to have 'size n '?

3. What about what it means for a set to be 'infinite'?

