

Math 55 Quiz 5  
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Name: \_\_\_\_\_

1. Let  $[n]$  denote the set  $\{1, \dots, n\}$ . (1 point each).
  - (a) How many functions  $f : [3] \rightarrow [5]$  are there?
  - (b) How many *injective* functions  $f : [3] \rightarrow [5]$  are there?
  - (c) How many *surjective* functions  $f : [3] \rightarrow [5]$  are there?
2. How many ways are there to deal hands of seven cards to each of five players from a standard deck of 52 cards? (2 points).
3. Prove by a combinatorial argument the following identity (4 points).

$$\binom{n}{k} = \binom{n-1}{k-1} + \binom{n-1}{k}$$

- (b) Prove the above identity using the formula for binomial coefficients. (1 point).