

## Quiz 5

1. A bin contains 10 ping-pong balls numbered 0, 1, 2, ..., 9. Six of the balls are red and four of them are white. An experiment consists of removing the balls from the bin, one at a time, until all 10 numbered balls have been removed. In how many outcomes of this experiment are all the white balls removed before any of the red balls are removed? Justify your answer. (8 pts.)

pull out 4 white balls in  $4!$  ways

next, pull out 6 red balls in  $6!$  ways.

Mult. rule  $\rightarrow$  total  $4!6! = \boxed{17,280}$

2. How many one-to-one functions  $f: A \rightarrow B$  are there if  $|A| = 4$  and  $|B| = 7$ ? Give a numeric answer and show the steps you used to compute it. (8 pts.)

Step 1: Choose which 4 elements of  $B$  are mapped to by  $f$  on  $A$ .  $\binom{7}{4}$  ways

total  $\binom{7}{4} \cdot 4!$   
 $= \boxed{840}$

Step 2: permute the 4 elements of  $B$   $4!$  ways.

3. The roster of a certain club basketball team contains 8 players, but only 5 players can be on the floor at one time during a game. How many 5-man teams are possible using this roster? Give a numeric answer. (4 pts.)

$$\binom{8}{5} = \frac{8 \cdot 7 \cdot 6}{3 \cdot 2 \cdot 1} = \boxed{56}$$