

Name: \_\_\_\_\_ Student's ID: \_\_\_\_\_

1. You have a fair five-sided die. The sides of the die are numbered from 1 to 5. Each die roll is independent of all others, and all faces are equally likely to come out on top when the die is rolled. Suppose you roll the die twice. What is the probability that the total of two rolls is at least 6 if at least one roll resulted in 1?
2. A dance class consists of 22 students (10 females and 12 males). 5 men and 5 women are to be chosen randomly and then paired up (a pair of 1 man and 1 woman). How many results are possible?

1. A: summation of rolls is at least 6

B: At least one roll is 1

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{2/25}{9/25} = 2/9$$

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| 1,1 | 1,2 | 1,3 | 1,4 | 1,5 |
| 2,1 | 2,2 | 2,3 | 2,4 | 2,5 |
| 3,1 | 3,2 | 3,3 | 3,4 | 3,5 |
| 4,1 | 4,2 | 4,3 | 4,4 | 4,5 |
| 5,1 | 5,2 | 5,3 | 5,4 | 5,5 |

Shaded box are elements of event A

elements in event B

(5,1) & (1,5) → are events in the  $A \cap B$

2. # of ways to choose 5 men out of 12 existing ones:  $\binom{12}{5}$

# " " " 5 females " 10 " ones:  $\binom{10}{5}$

# of ways to pair 5 men & 5 female.

assume blanks  
ad men →  $\frac{5 \times 4 \times 3 \times 2 \times 1}{\uparrow}$

There are  
5 females for  
the first group

→ # of ways  
to select 5 men =  $\binom{12}{5} \binom{10}{5} 5!$   
& 5 female & then  
Pair them up