

# KSooklall\_Homework6 DATA-605

Kenan Sooklall

3/3/2021

1. A bag contains 6 green and 9 red jellybeans. How many ways can 5 jellybeans be withdrawn from the bag so that the number of green ones withdrawn will be less than 4?

$3g2r, 2g,3r, 1g,4r$

**Answer:** 3

2. A certain congressional committee consists of 14 senators and 13 representatives. How many ways can a subcommittee of 7 be formed if at least 4 of the members must be senators?

$4s3r,5s2r,6s1r,7s0r$

**Answer:** 4

3. If a coin is tossed 2 times, and then a standard six-sided die is rolled 4 times, and finally a group of three cards are drawn from a standard deck of 52 cards without replacement, how many different outcomes are possible?  $2^2 * 46 + 5251*50$

**Answer:** 132696

4. 3 cards are drawn from a standard deck without replacement. What is the probability that at least one of the cards drawn is a heart? Express your answer as a fraction or a decimal number rounded to four decimal places.

$39/52 * 38/51 * 37/50$

**Answer:** 41.35

5. Leanne is picking out some movies to rent, and she is primarily interested in children's movies and comedies. She has narrowed down her selections to 18 children's movies and 7 comedies.

Step 1. How many different combinations of 3 movies can she rent?

$\text{choose}(18+7,3)$

**Answer:** 2300

Step 2. How many different combinations of 3 movies can she rent if she wants at least one comedy?

$\text{choose}(18+6,2) + 1$

Answer: 277

6. DJ Jacqueline is making a playlist for an internet radio show; she is trying to decide what 6 songs to play and in what order they should be played. If she has her choices narrowed down to 7 hip-hop, 14 pop, and 22 blues songs, and she wants to play an equal number of hip-hop, pop, and blues songs, how many different playlists are possible? Express your answer in scientific notation rounding to the hundredths place.

Hip hop will be the bottle neck so 7 hh, 7 pop, 7 blues

Answer: 343

7. DJ Howard is making a playlist for a friend; he is trying to decide what 9 songs to play and in what order they should be played.

Step 1. If he has his choices narrowed down to 7 pop, 3 hip-hop, 6 country, and 7 blues songs, and he wants to play no more than 3 country songs, how many different playlists are possible? Express your answer in scientific notation rounding to the hundredths place.

3 country \* 7 pop \* 3 hip-hop \* 7 blues

Answer: 441

Step 2. If he has his choices narrowed down to 7 pop, 3 hip-hop, 6 country, and 7 blues songs, and he wants to play all 7 blues songs, how many different playlists are possible? Express your answer in scientific notation rounding to the hundredths place.

7 pop \* 3 hip-hop \* 6 country \* 7 blues

Answer: 882

8. Mallory is planting trees along her driveway, and she has 3 beech trees and 3 eucalyptus trees to plant in one row. What is the probability that she randomly plants the trees so that all 3 beech trees are next to each other and all 3 eucalyptus trees are next to each other? Express your answer as a fraction or a decimal number rounded to four decimal places.

Choices: bbbbee, eeebbb

Choosing beech first  $3/6 \cdot 2/5 \cdot 1/4 = 6/120 = 1/20$

same logic for choosing eucalyptus first  $\rightarrow 2 \cdot 1/20 = 1/10$

Answer: 1/10

9. If you draw a queen or lower from a standard deck of cards, I will pay you \$4. If not, you pay me \$14. (Aces are considered the highest card in the deck.)

Step 1. Find the expected value of the proposition. Round your answer to two decimal places. Losses must be expressed as negative values.

higher\_than\_queen = 8 (4(K,A))  $\rightarrow 15.4\%$  win queen\_or\_lower = 52 - 8 = 44  $\rightarrow 84.6\%$  win  $E(X) = 4 \cdot 44/52 - 14 \cdot 8/52$

Answer: \$1.23

Step 2. If you played this game 759 times how much would you expect to win or lose? Round your answer to two decimal places. Losses must be expressed as negative values.

```
set.seed(42)
winnings<- c(-14, 4)
sum(table(sample(c('Qlower','Qhigher'), size=759, prob=c(44/52,8/52), replace=TRUE)) * winnings)
```

```
## [1] 984
```

Answer: \$984