# CIS7 Unit 6 In-Class Assignment: Probability

Refer to class note and textbook Chapter 9 to solve the following problems.

1. When using a pair of dice, red and black, what is the sample space?

{(Red 1, Black 1),(Red 1, Black 2),(Red 1, Black 3),(Red 1, Black 4),(Red 1, Black 5),(Red 1, Black 6),(Red 2, Black 1),(Red 2, Black 2),(Red 2, Black 3),(Red 2, Black 4),(Red 2, Black 5),(Red 2, Black 6),(Red 3, Black 1),(Red 3, Black 2),(Red 3, Black 3),(Red 3, Black 4),(Red 3, Black 5),(Red 3, Black 6),(Red 4, Black 1),(Red 4, Black 2),(Red 4, Black 3),(Red 4, Black 4),(Red 4, Black 5),(Red 4, Black 6),(Red 5, Black 1),(Red 5, Black 2),(Red 5, Black 3),(Red 5, Black 4),(Red 5, Black 5),(Red 5, Black 6),(Red 6, Black 1),(Red 6, Black 2),(Red 6, Black 3),(Red 6, Black 4),(Red 6, Black 5),(Red 6, Black 6)}

1. Using the same pair of dice in Exercise 1.
2. How many ways can you roll the dice to yield 7?

6

| **Color** | **Roll** |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Red** | **1** | **2** | **3** | **4** | **5** | **6** |  |
| **Black** | **6** | **5** | **4** | **3** | **2** | **1** |  |

1. What is the probability of rolling a sum of 7 with the pair of dice?

1/36= %2.777777

1. What is the probability of rolling a sum of less than 7 with a pair of dice?

15 / 36

| **Color** | **Roll** |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Red** | **1** | **4** | **6** | **5** | **1** | **3** |
| **Black** | **1** | **3** | **5** | **4** | **6** | **5** |

1. What is the probability of rolling dice to result a Snake eye? 1 on each dice.

1 / 36

1. What is the probability of red dice has a higher result than the black dice?

15/36

| **Color** | **Roll** |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Red** |  |  |  |  |  |  |  |
| **Black** |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4 | 3 | 6 | 5 | 4 | 4 | 4 |
| 1 | 5 | 6 | 5 | 1 | 1 | 3 |
| 5 | 8 | 12 | 10 | 5 | 5 | 7 |

1. What is the probability of rolling even on both dice?

**18/36**

| **Color** | **Roll** | **Roll** | **Roll** | **Roll** | **Roll** | **Roll** | **Roll** | **Roll** | **Roll** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Red** |  |  |  |  |  |  |  |  |  |
| **Black** |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4 | 2 | 6 | 2 | 4 | 2 | 6 |
| 6 | 3 | 6 | 6 | 2 | 5 | 1 |

1. If a single card is drawn from a standard deck of 52 cards, what is the probability of each of these events?
2. The card is a Queen

4/52

1. The card is a red face card.

16 / 52

1. The card has the same suit

1/4

1. The card is an even number.

5/13

1. Ten balls numbered 1 to 10 are in a bag.
2. What is the probability of drawing the ball numbered 8 on a single draw?

1/10

1. What is the probability of drawing the ball numbered 8 in three draws if: The ball drawn is always returned to the bag before the next selection?

**1/1000**

1. What is the probability of drawing the ball numbered 8 in three draws if: The balls are not returned to the bag before the next selection?

**1/10 \* 1/9 \* 1/8**

1. What is the probability of drawing the numbers 9, 5, 2 in any order in three draws if: The ball drawn is always returned to the bag before the next selection?

27/1000

1. What is the probability of drawing the numbers 9, 5, 2 in any order in three draws if: The balls are not returned to the bag before the next selection?

(6/10!)

1. Create a tree diagram for a TV manufacturing to determine the probability of a random selection:

A TV manufacturer has three factories Site 1, Site 2, and Site 3 which produce 50%, 25%, and 25%, respectively, of televisions. 70% of the screens produced in Site 1 are LED televisions, 25% of those produced in Site B are LED televisions, and 25% of the televisions produced in Site 3 are LED televisions. If a television produced by the manufacturer is selected at random, calculate the probability that the selection will be a LED television.”

(0.5 \* 0.7) + (0.25 \* 0.25) + (0.25 \* 0.25)

1. (Optional) Travelers in Hawaii:

Once visitors arrive at Honolulu, Oahu, they want to enjoy the sun and beaches on 2 popular neighboring islands: Maui and Kauai.

When on Oahu, 70% of tourists plan to go to Maui, 20% to Kauai, and only 10% remain on shore the next day.

When on Maui, 40% continue to stay on Maui, 50% plan to go to Kauai, and only 10% return to Oahu the next day.

Finally, when on Kauai Island, 30% prolong their stay here, 30% divert to Maui, and 40% go back to Honolulu, Oahu the next day.

Starting from Oahu, what is the probability (in percentage) that the travelers will be on the Oahu at the end of a 3-day trip? Provide transition matrix (1-step) and 3-step transition matrix.

