

## Getting Familiar with the Standard Card Deck

How many cards are in our standard deck? \_\_\_\_\_

How many cards are red? \_\_\_\_\_

How many cards are NOT red? \_\_\_\_\_

How many cards are diamonds? \_\_\_\_\_

How many cards are 7s? \_\_\_\_\_

How many cards are face cards? \_\_\_\_\_

How many cards are Kings AND black?  
(both attributes at the same time) \_\_\_\_\_

How many cards are 9s OR Jacks?  
(either or both of the attributes) \_\_\_\_\_

How many cards are Queens OR spades?  
(either or both of the attributes) \_\_\_\_\_

## Getting Familiar with the Standard Card Deck

How many cards are in our standard deck? 52

How many cards are red? 26

How many cards are NOT red? 26

How many cards are clubs? 13

How many cards are 7s? 4

How many cards are face cards? 12

How many cards are Kings AND black?  
(both attributes at the same time) 2 king of clubs  
king of spades

How many cards are 9s OR Jacks?  
(either or both of the attributes) 8

How many cards are Queens OR spades?  
(either or both of the attributes) 16

4 Queens + 13 spades - 1 Queen of spades =  
16 distinct cards

We remember from our last class that the PROBABILITY (P) of an event can be expressed as a ratio. The numerator (top number in the ratio) indicates the number of ways the event we are interested in can happen. The denominator (bottom number in the ratio) indicates the total number of outcomes possible.

If we consider events involving drawing a single card at random from our standard deck, our denominator will be the total number of cards which is \_\_\_\_\_.

EXAMPLE 1: Find the probability of drawing an ace at random from the standard deck.

Numerator = number of aces = \_\_\_\_\_

Denominator = number of cards in the deck = \_\_\_\_\_

$$P(\text{ace}) = \frac{\square}{\square}$$

We remember from our last class that the PROBABILITY (P) of an event can be expressed as a ratio. The numerator (top number in the ratio) indicates the number of ways the event we are interested in can happen. The denominator (bottom number in the ratio) indicates the total number of outcomes possible.

If we consider events involving drawing a single card at random from our standard deck, our denominator will be the total number of cards which is 52.

EXAMPLE 1: Find the probability of drawing an ace at random from the standard deck.

Numerator = number of aces = 4

Denominator = number of cards in the deck = 52

$$P(\text{ace}) = \frac{\boxed{4}}{\boxed{52}}$$

Try a few more problems. We are still drawing one card at random from a standard deck. HINT: USE YOUR FIRST PAGE WHERE WE EXPLORED THE STANDARD DECK.

$$P(\text{red}) = \frac{\square}{\square + \square}$$

$$P(\text{club}) = \frac{\square}{\square + \square}$$

$$P(\text{face card}) = \frac{\square}{\square + \square}$$

Try a few more problems. We are still drawing one card at random from a standard deck. HINT: USE YOUR FIRST PAGE WHERE WE EXPLORED THE STANDARD DECK.

$$P(\text{red}) = \frac{26}{52}$$

$$P(\text{club}) = \frac{13}{52}$$

$$P(\text{face card}) = \frac{12}{52}$$

Now let's suppose we draw our first card, DISCARD it, and then draw a second card. This is called drawing two cards in succession, WITHOUT REPLACEMENT.

How many cards were in the deck for our first draw? \_\_\_\_\_

How many cards will be left in the deck for our second draw? \_\_\_\_\_

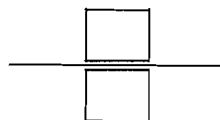
Let's work an example together and then you can practice some on your own.

EXAMPLE 2: Find the probability of drawing an ace on the second draw GIVEN that we also drew an ace (and discarded it ) on our first draw.

Question1: How many aces remain in the deck after we draw and discard our first ace? \_\_\_\_\_

Question 2: How many cards remain in the deck after our first card is discarded? \_\_\_\_\_

So,  $P(\text{second card is an ace GIVEN first card was an ace}) =$



Now let's suppose we draw our first card, DISCARD it, and then draw a second card. This is called drawing two cards in succession, WITHOUT REPLACEMENT.

How many cards were in the deck for our first draw? 52

How many cards will be left in the deck for our second draw? 51

Let's work an example together and then you can practice some on your own.

EXAMPLE 2: Find the probability of drawing an ace on the second draw GIVEN that we also drew an ace (and discarded it ) on our first draw.

Question1: How many aces remain in the deck after we draw and discard our first ace? 3

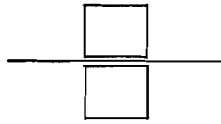
Question 2: How many cards remain in the deck after our first card is discarded? 51

So, P(second card is an ace GIVEN first card was an ace) =

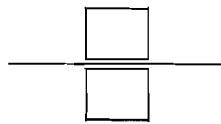
$$\frac{3}{51}$$

Try these on your own.

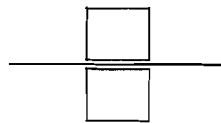
$P(\text{second card is red GIVEN first card was red}) =$



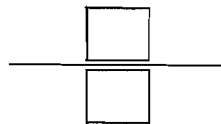
$P(\text{second card is red GIVEN first card was black}) =$



$P(\text{second card is a Jack GIVEN first card was NOT a Jack}) =$



$P(\text{second card is a face card GIVEN first card was a King}) =$



Try these on your own.

P(second card is red GIVEN first card was red) =

$$\frac{25}{51}$$

P(second card is red GIVEN first card was black) =

$$\frac{26}{51}$$

P(second card is a Jack GIVEN first card was NOT

a Jack) =

$$\frac{4}{51}$$

P(second card is a face card GIVEN first card was a King) =

$$\frac{11}{51}$$

# HEARTS

# DIAMONDS

# CLUBS

# SPADES

Ace

Ace

Ace

Ace

1

1

1

1

2

2

2

2

3

3

3

3

4

4

4

4

5

5

5

5

6

6

6

6

7

7

7

7

8

8

8

8

9

9

9

9

10

10

10

10

Jack

Jack

Jack

Jack

Queen

Queen

Queen

Queen

King

King

King

King