Standard Deck of Cards

♥ King	♦ King	♠ King	♣ King
♥ Queen	♦ Queen	♠ Queen	♣ Queen
♥ Jack	♦ Jack	♠ Jack	♣ Jack
♥ 10	♦ 10	♠ 10	♣ 10
♥ 9	♦ 9	♠ 9	♣ 9
♥ 8	♦ 8	♠ 8	♣ 8
♥ 7	♦ 7	♠ 7	♣ 7
♥ 6	♦ 6	♠ 6	♣ 6
♥ 5	♦ 5	♠ 5	♣ 5
♥ 4	♦ 4	♠ 4	♣ 4
♥ 3	♦ 3	♠ 3	♣ 3
♥ 2	♦ 2	♠ 2	♣ 2
♥ Ace	♦ Ace	♠ Ace	♣ Ace

From a standard deck of cards, one card is drawn. What is the probability that the card is black and a jack? P(Black and Jack)

P(Black) = 26/52 or ½ , P(Jack) is 4/52 or 1/13 so P(Black and Jack) = ½ * 1/13 = 1/26

A standard deck of cards is shuffled and one card is drawn. Find the probability that the card is a queen or an ace. P(Q or A) = P(Q) = 4/52 or 1/13 + P(A) = 4/52 or 1/13 = 1/13 + 1/13 = 2/13

WITHOUT REPLACEMENT: If you draw two cards from the deck without replacement, what is the probability that they will both be aces? P(AA) = (4/52)(3/51) = 1/221.

WITHOUT REPLACEMENT: What is the probability that the second card will be an ace if the first card is a king? P(A|K) = 4/51 since there are four aces in the deck but only 51 cards left after the king has been removed.

WITH REPLACEMENT: Find the probability of drawing three queens in a row, with replacement. We pick a card, write down what it is, then put it back in the deck and draw again. To find the P(QQQ), we find the probability of drawing the first queen which is 4/52. The probability of drawing the second queen is also 4/52 and the third is 4/52. We multiply these three individual probabilities together to get P(QQQ) = P(Q)P(Q)P(Q) = (4/52)(4/52)(4/52) = .00004 which is very small but not impossible.

Probability of getting a royal flush = P(10 and Jack and Queen and King and Ace of the same suit)

What's the probability of being dealt a royal flush in a five card hand from a standard deck of cards? (Note: A royal flush is a 10, Jack, Queen, King, and Ace of the same suit. A standard deck has 4 suits, each with 13 distinct cards, including these five above.) (NB: The order in which the cards are dealt is unimportant, and you keep each card as it is dealt -- it's not returned to the deck.)

The probability of drawing any card which could fit into some royal flush is 5/13. Once that card is taken from the pack, there are 4 possible cards which are useful for making a royal flush with that first card, and there are 51 cards left in the pack. therefore the probability of drawing a useful second card (given that the first one was useful) is 4/51. By similar logic you can calculate the probabilities of drawing useful cards for the other three. The probability of the royal flush is therefore the product of these numbers, or

5/13 * 4/51 * 3/50 * 2/49 * 1/48 = .00000154