

3.2 Conditional Probability and the Multiplication Rule

Assign:

Conditional probability is the probability of an event occurring, given that another event has already occurred. $P(B/A)$

Ex #1. Two cards are selected in sequence from a standard deck of cards. Find the P that the second card is a queen, given that the first card is a king.

Ex #2.

	Gene Present	Gene NOT Present	
High IQ	33	19	52
Low IQ	39	11	50
Total	72	30	102

Find the P that a child has a high IQ, given that the child has the gene.

Find the P that a gene is not present, given the child has a low IQ.

Independent Events are events for which the occurrence of any one of the events does not affect the probabilities of the occurrences of the other event. $P(A \cap B) = P(A) \cdot P(B)$

Dependent Events are events for which the occurrence of any one event affects the probabilities of the occurrences of the other events.

Multiplication Rule: $P(A \text{ and } B) = P(A) \cdot P(B)$

Ex #1. What is the probability of getting a 4 on a die and getting a tail on the toss of a coin?

Ex #2. A jar contains 5 red marbles, 3 green marbles, and 2 yellow marbles. You wish to draw 2 marbles without replacing the first before you draw the second. Find the P that the first marble is red and the second marble is green.

If you replace the first marble, the events are independent, what would the probability be then?

Ex #3. Find the probability of drawing 2 kings from a standard deck of cards without replacing the first.

If you replace the first king, the events are independent, what would the probability be then?

"At least one" is equivalent to "1 or more". The compliment of "at least one" is that you get NO items of that type. $P(A) = 1 - P(\bar{A})$

Ex. If a family is going to have four children, what is the P that they will have at least one girl?