3.8: Chapter Review

3.2: Terminology

In this module we learned the basic terminology of probability. The set of all possible outcomes of an experiment is called the sample space. Events are subsets of the sample space, and they are assigned a probability that is a number between zero and one, inclusive.

3.3: Independent and Mutually Exclusive Events

Two events *A* and *B* are independent if the knowledge that one occurred does not affect the chance the other occurs. If two events are not independent, then we say that they are dependent.

In sampling with replacement, each member of a population is replaced after it is picked, so that member has the possibility of being chosen more than once, and the events are considered to be independent. In sampling without replacement, each member of a population may be chosen only once, and the events are considered not to be independent. When events do not share outcomes, they are mutually exclusive of each other.

3.4: Two Basic Rules of Probability

The multiplication rule and the addition rule are used for computing the probability of *A* and *B*, as well as the probability of *A* or *B* for two given events *A*, *B* defined on the sample space. In sampling with replacement each member of a population is replaced after it is picked, so that member has the possibility of being chosen more than once, and the events are considered to be independent. In sampling without replacement, each member of a population may be chosen only once, and the events are considered to be not independent. The events *A* and *B* are mutually exclusive events when they do not have any outcomes in common.

3.5: Contingency Tables and Probability Trees

There are several tools you can use to help organize and sort data when calculating probabilities. Contingency tables help display data and are particularly useful when calculating probabilities that have multiple dependent variables.

A tree diagram use branches to show the different outcomes of experiments and makes complex probability questions easy to visualize.

3.6: Venn Diagrams

A Venn diagram is a picture that represents the outcomes of an experiment. It generally consists of a box that represents the sample space S or universe of the objects of interest together with circles or ovals. The circles or ovals represent groups of events called sets. A Venn diagram is especially helpful for visualizing the $\cup\cup$ event, the $\cap\cap$ event, and the complement of an event and for understanding conditional probabilities. A Venn diagram is especially helpful for visualizing an Intersection of two events, a Union of two events, or a Complement of one event. A system of Venn diagrams can also help to understand Conditional probabilities. Venn diagrams connect the brain and eyes by matching the literal arithmetic to a picture. It is important to note that more than one Venn diagram is needed to solve the probability rule formulas introduced in Section 3.4.