11.8 Expected Value

Expected value is a mathematical way to use probabilities to determine what to expect in various situations over the long run.

# Objective 1: Compute expected value

**Expected value** is calculated by multiplying each possible outcome by its probability and adding these products.

# Objective 2: Use expected value to solve applied problems

Expected value is used to determine premiums on insurance policies and to weigh the risks and benefits of alternatives in business ventures. Note that outcomes may be positive or negative and are **net outcomes** calculated by subtracting the cost of achieving the outcome is from the gain.

# Objective 3: Use expected value to determine the average payoff or loss in a game of chance

Expected value can be interpreted as the average payoff in a contest or game when either is played a large number of times. Games in gambling casinos are set up so that expected values are negative. Over time, the house always wins.