Name _____

4.3: Expected Value

<u>Class Prep Assignment</u>   <u>Due at the beginning of next class</u>

The Law of Large Numbers: In an experiment with independent trials, as you increase the number of trials the relative frequency gets closer to the theoretical probability.

Example 1. Theo rolled a standard 6-sided die 1,000 times and recorded that the number 2 came up 100 times. He suspects that the die is not fair. Is he correct?

Gambler's Fallacy: The mistaken belief that a streak or run of bad luck will make the opposite outcome more likely.

Expected Value: The long run average or mean value for many repeated samples.

   The expected value is an _____ that is weighted by the _____.

Example 2. A lottery ticket has five possible prize amounts and the chances of winning each are shown in the probability model.

Prize	$1	$10	$50	$1000	0
Probability	$\dfrac{1}{5}$	$\dfrac{1}{50}$	$\dfrac{1}{100}$	$\dfrac{1}{2000}$	$\dfrac{1539}{2000} = 0.7695$

   a. Find the expected value for this lottery ticket.

   b. If the cost of the ticket is $2, what are your expected winnings?

Example 3. Primo Insurance sells an annual car insurance policy for $1,350. Based on past data collected, an average of 1 in 50 policyholders will file a $6,000 claim, an average of 1 in 100 policyholders will file a $15,000 claim, and an average of 1 in 300 policyholders will file a $33,000 claim.

Insurance Payout				
Probability				

   a. Find the expected value for the amount that Primo will pay per policy.

   b. What is the expected profit or loss per policy?