Objective 4: I can find the expected value of a discrete probability experiment.

The mean of a random variable represents what you would expect to happen for thousands of trials. It is also called the expected value. The expected value of a discrete random variable is equal to the mean of the random variable.

Expected Value = $E(x) = \sum x \cdot P(x)$

Ex 7: At a raffle, 1500 tickets are sold for $2 each for four prizes of $500, $250, $150, and $75. You buy one ticket. What is the expected value of your gain?

-2 -2 -2 -2

4 winners

1500 − 4 = 1496 losers

X	P(X)	X • P(X)
−2	1496/1500	−1.995
498	1/1500	.332
248	1/1500	.165
148	1/1500	.099
73	1/1500	.049
		Σ = −1.35

Lose $1.35 per ticket.

*Although individual probabilities cannot be negative, expected value can (and usually is).

TIY 7: At a raffle, 2000 tickets are sold at $5 each for 5 prizes of $2000, $1000, $500, $250, and $100. You buy one ticket. What is the expected value of your gain?

X	
$P(x)$	
$X \cdot P(x)$	

Ex 8: EFHS is holding a raffle to raise money for the senior party. Tickets are $5 each and only 500 tickets will be sold. The prizes are $500, $250, and five people will win $75. You buy one ticket. Find the expected value of your gain.

X	P(X)	X · P(X)
−5	493/500	−4.93
495	1/500	.99
245	1/500	.49
70	5/500	~~4~~ .7
	Σ = 1	Σ = ~~−3.34~~ −2.75

−5 −5 −5

7 winners

500 − 7 = 493 losers

2.75

Lose $~~3.31~~

per ticket.

Pg 204 #45, 46 and the 3 problems on the small sheet.

Statistics 4.1--Expected Value Name: _____

1) The senior class needs to raise money for the senior party. They are selling 3000 raffle tickets at $10 each. First prize is $2500, second prize is $1000 and 3rd prize is $500. What is the expected value of each ticket?

2) In a raffle, 1000 tickets are sold for $2 each. One ticket will randomly be selected and the winner will receive a laptop computer valued at $1200. What is the expected value for a person that buys one ticket?

3) At a raffle, 10,000 tickets are sold at $5 each for three prizes valued at $5000, $1500, and $1000. What is the expected value of one ticket?

45. In American roulette, the wheel has the 38 numbers

$$00, 0, 1, 2, \ldots, 34, 35, \text{and } 36$$

marked on equally spaced slots. If a player bets \$1 on a number and wins, then the player keeps the dollar and receives an additional 35 dollars. Otherwise, the dollar is lost.

46. A charity organization is selling \$4 raffle tickets as part of a fund-raising program. The first prize is a boat valued at \$3150, and the second prize is a camping tent valued at \$450. The remaining 15 prizes are \$25 gift certificates. The number of tickets sold is 5000.