

Expected Value

(Section 13.4)

The objectives for this section include:

1. Understand the meaning of expected value.
2. Use expected value to solve applied problems to determine if they are fair.

Review

Odds in favor is the number of desired outcomes: number of undesired outcomes.

What are the odds in favor of picking a three from a standard deck of cards?

The expected value tells how much, on the average over the long run, each play is worth to you. It takes into account the amount of money you pay to play.

Expected Value = (Probability of Event 1)(Value of Event 1) + (Probability of Event 2)(Value of Event 2) + ...

You need to include the cost of playing in the value of each event or the cost at the end

1. Class Practice – A coin game charges \$1 to play a round that involves flipping three coins. If you have two or three heads, you win \$3; otherwise you lose your dollar. Calculate the expected value for this game.

Suggested steps

- a) List the set that includes two or three heads
- b) Calculate the expected value using the net values of each event
- c) Calculate the expected value using the gross value winnings minus the cost of playing

2. Class Practice – Five hundred tickets are sold for a raffle that charges \$1/ticket. The prize is a new i-pod valued at \$400. a) What is the expected value?

b) What is the organizers total expected profit?

In a fair game, you break even over the long run so the expected value = 0.

3. Class Practice – Calculate the price to play the coin game described in #1 so that it would make the game fair.

Complete **Quiz Yourself 12** on p. 765

4. Class Practice – #9 from p. 766 A card is drawn from a standard 52-card deck. Calculate your expected value if a heart is drawn, you win \$10 otherwise you lose.

Is this a fair game? _____ If not what is a fair price to charge? _____

Assignment for Friday 10/28

Read pp. 761-766, Finish Guided Notes pp. 56-57

Complete #1, 3, 5, 6, 11, 14, 15, 19, 31, 37 on pp. 766-768

& Section 13.4 Handout

Re-Quiz Friday over Sections 13.1-13.3 for those who like to take the higher of the quizzes this week it will be the last 15 minutes of class.