Time Frame: 50 minutes

Subject Matter: Discrete Probability Distribution

Objective: TSWBAT Find the expected value for a discrete random variable.

Standards: DA – 5.11

 Materials: Transparencies and Worksheets

SHOW ME

Presentation of Information:

The teacher will discuss the following:

* Expected Value

The expected value of a discrete random variable of a probability distribution is the theoretical average of the variable. The formula is

$$μ=E\left(x\right)= ΣX∙P(X)$$

* + This can be used in various types of games of chance, in insurance, and in other areas, such as decision theory.

Example (from homework)

One thousand tickets are sold at $1 each for a color TV valued at $350. What is the expected value of the gain if a person purchases one ticket?

Solution:

Outcome X ­­­ $349 -$1\_\_\_­­

Probability P(X) $\frac{1}{1000}$ $\frac{999}{1000}$

$$E\left(X\right)=\$249∙\frac{1}{1000}+-\$1∙\frac{999}{1000}$$

$E\left(X\right)=-\$0.65$ Answer

Let Me Try

A roulette wheel has 38 numbers: 1 through 36, 0, and 00. One-half of the numbers from 1 through 36 are red, and one-half are black. A ball is rolled, and it falls into one of the 38 slots, giving a number and a color. Green is the color for 0 and 00. When a player wins, the player gets his dollar back in addition to the amount of the payoff. The payoffs for a $1 bet are

|  |  |
| --- | --- |
| Red or Black $1 | 0 $35 |
| Odd or Even $1 | 00 $35 |
| 1 – 18 $1 | Any single number $35 |
| 19 – 36 $1 | 0 or 00 $17 |

 If a person bets $1 on any one of these before the ball is rolled, find the expected value for each.

1. Red
2. Even (exclude 0 and 00)
3. 0
4. Any single value
5. 0 or 00

Homework:

Prepare for a test