

5/11/15

11-2-2 Discrete Probability - Expected Values

mean of Probability Distribution

$$\mu = \sum_i (X \cdot P(X))$$

Variance & Standard Deviation of Probability Dist.

$$\text{Var} \rightarrow \sigma^2 = \sum_i [(X - \mu)^2 \cdot P(X)] \quad \text{S.D. } \sigma = \sqrt{\sigma^2}$$

Expected Value

$$E(X) = \mu = \sum_i [X \cdot P(X)]$$

mean of the Random Variable of the probability Distribution

Ex: Expected Value / Net gain

Raffle \rightarrow 500 tickets sold at \$1 each

Prizes \rightarrow 1-\$100, 1-\$50, 1-\$10, or Nothing
497-\$0

| | | | | |
|-----------|---------------------------|-------------------------|-------------------------|---------------------------|
| Gain, X | \$100-1 \$99 | \$50-1 \$49 | \$10-1 \$9 | \$0-1 -\$1 |
| Prob P(X) | $\frac{1}{500} =$.002 | $\frac{1}{500}$.002 | $\frac{1}{500}$.002 | $\frac{497}{500}$.994 |

$$(99 \cdot .002) + (49 \cdot .002) + (.002 \cdot 9) + (.994 \cdot -1) = \$-.68$$

\$.68 Loss per ticket purchased

HW 671: 10-12, 25, 35, 50-51