

Unit 3 Day 2:
Probability Distributions
(5.2) Expected Value

Example

A game consists of rolling a colored die with three red sides, two green sides, and one blue side. A roll of a red loses. A roll of a green pays \$2. A roll of blue pays \$5. The charge to play the game is \$2. Would you play this game? Why or why not?

R 3 G 2 B 1 → 6 total

X	-2	0	3
P(x)	3/6	2/6	1/6

$$E(x) = (-2)(3/6) + 0(2/6) + 3(1/6)$$

$$= -0.50$$

I would not play this game. It is not fair and in favor of the house because it is negative

Example

Your company plans to invest in a project. There is a 35% chance that you will lose \$30,000, a 40% chance that you will break even, and a 25% chance that you will make \$55,000. Based on this information, what should you do?

x	-30,000	0	55,000
$P(x)$	0.35	0.40	0.25

$$E(x) = -30,000(0.35) + 0(0.4) + 55,000(0.25)$$
$$= 3250$$

yes, you should invest! $E(x)$ is positive so in favor of you!

Example

A game consists of rolling a colored die with three green sides, two red sides, and one blue side. A roll of a red loses. A roll of a blue pays \$6. A roll of green pays \$2. What is a "fair" price to pay to play?

G 3 R 2 B 1 → 6 total

X	6	2
P(x)	1/6	3/6

$$E(x) = 6\left(\frac{1}{6}\right) + 2\left(\frac{3}{6}\right)$$

$$= 2$$

← Find the $E(x)$ of the info you know, and choose opposite value for price to make the game "fair"

(where $E(x) = 0$)

→ A "fair" price to pay would be \$2 (AKA -2)

Assignment:

Unit Plan Day 2 HW Worksheet

Unit 4 Quiz

Monday 2/24

Unit 4 Test

Friday 3/13