

Name _____

Investigation 13: What Is the Expected Cost to Raise a Child?

Worksheet 13.1 Introducing Expected Value

During the 2018 Major League Baseball playoffs, one team played in 10 games before losing the division series. In the 10 games, they scored 1 run in 2 games, 2 runs in 1 game, 4 runs in 4 games, and 6 runs in 3 games.

1. Complete the frequency table below.

Number of Runs	Frequency
1	
2	
4	
6	

2. Construct a dot plot for the runs scored with the variable “runs scored” on the horizontal axis.
3. What is the mean number of runs scored per game for the team? Explain how you found the answer and interpret the mean.

Suppose you knew that the team scored 1 run in 20% of the games, 2 runs in 10% of the games, 4 runs in 40% of the games, and 6 runs in 30% of the games, but you didn't know the number of games played.

4. Construct a histogram of the number of runs scored with the vertical axis as percent. How does this graph compare with the dot plot in problem 2?

5. Calculate the mean number of points scored. Explain how you found the answer.

A **mean** calculated from a probability distribution - an anticipated distribution of outcomes – is called an **expected value**.

Let the variable X = the number of runs scored by the team. The variable X is called a **random variable**.

The probability distribution for a random variable can be displayed in a two-column table like the one shown below for the variable X - the number of runs scored. The symbol $P(X)$ represents the probability of the team scoring X runs in a randomly selected game.

X	$P(X)$
1	0.2
2	0.1
4	0.4
6	0.3

A commonly used symbol for the expected value of X is $E(X)$.

6. Write a symbolic expression for the expected value of X . Recall how you explained the method used to find the mean of the distribution.