

Intro to Stats: Homework 5.1-2, Day 2

You may do your work and show your answers right on this page.

1. Suppose we play a game where we toss two fair coins. If we get two heads, then we win \$60. If we get two tails, then we lose \$80. If we get one head and one tail, then we win \$8. What is the expected value of this game?

2. The Massachusetts Lottery scratch ticket game “Solid Gold” has prizes and probabilities as shown on the chart below. Find the expected value for the game, and then decide if this is mathematically a good game to play. (The tickets cost \$1 each.)

Prize	Probability
\$5000	0.000002
\$1000	0.000006
\$100	0.000271
\$50	0.002778
\$15	0.003333
\$10	0.010000
\$5	0.010000
\$4	0.020000
\$2	0.076667
\$1	0.086655

3. Hammer’s Textbook Insurance Company provides coverage for lost textbooks for students. The plan pays \$30 for each lost textbook, up to 3 books. It is known that 40% of students lose 1 book during the semester, 10% lose 2 books, and 5% lose 3 books. If HTIC wants to make \$5 off of each policy, what should they charge for each policy? (That is, find the expected value of the “game,” then add \$5 to it.)

4. Three males with an X-linked genetic disorder have one child each. The random variable Y is the number of children among the three who inherit the X-linked genetic disorder. The pdf for Y is shown below. Find the mean μ and standard deviation σ for this rv. (Note: I've placed the columns $y \cdot P(y)$ and $y^2 \cdot P(y)$ on the grid, since those are the columns that can help you find the mean and standard deviation.)

y	$P(y)$	$y \cdot P(y)$	$y^2 \cdot P(y)$
0	0.4219		
1	0.4219		
2	0.1406		
3	0.0156		

5. In the World Series of Major League Baseball, the first team to win four games wins the series. If we let random variable X be the number of games that the series lasts, clearly the least value of X is 4 and the greatest value is 7. The table below shows the pdf for X , where the probabilities are based on historical data. Find the mean and standard deviation for the number of games the World Series lasts.

x	$P(x)$
4	0.182
5	0.212
6	0.232
7	0.374