Exercise: Random variables with bounded range

(3/3 points)

Suppose a random variable X can take any value in the interval $[-1, 2]$ and a random variable Y can take any value in the interval $[-2, 3]$.

a) The random variable $X - Y$ can take any value in an interval $[a, b]$. Find the values of a and b:

$a =$ -4 ✔ **Answer:** -4

$b =$ 4 ✔ **Answer:** 4

b) Can the expected value of $X + Y$ be equal to 6?

No ✔ **Answer:** No

Answer:
a) The smallest possible value of $X - Y$ is obtained if X takes its smallest value, -1, and Y takes its largest value, 3, resulting in $X - Y = -1 - 3 = -4$. Similarly, the largest possible value of $X - Y$ is obtained if X takes its largest value, 2, and Y takes its smallest value, -2, resulting in $X - Y = 2 - (-2) = 4$.

b) No matter what the outcome of the experiment is, the value of $X + Y$ will be at most 5, and so the expected value can be at most 5.

You have used 1 of 2 submissions

Exercises 7 due Mar 02, 2016 at 23:59 UTC

Solved problems

Additional theoretical material

Problem Set 4
Problem Set 4 due Mar 02, 2016 at 23:59 UTC

Unit summary