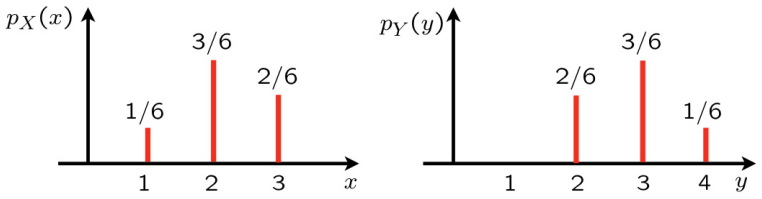
3. Exercise: Discrete convolution

Exercises due Mar 25, 2020 05:29 IST *Completed*

Exercise: Discrete convolution

1/1 point (graded)

The random variables X and Y are independent and have the PMFs shown in this diagram.



The probability that $X + Y = 6$ is: 1/4 ✔ **Answer:** 0.25

(Although you can find the answer by inspection, try to use the flip-and-shift graphical method.)

Solution:

We flip the PMF of Y to obtain a PMF on the set $\{-4, -3, -2\}$. We shift it to the right by 6 and place it underneath the PMF of X. By multiplying the probabilities that are on top of each other in the resulting diagram, we obtain

$$p_{X+Y}(6) = \frac{1}{6} \cdot \frac{3}{6} + \frac{3}{6} \cdot \frac{2}{6} = \frac{9}{36} = 1/4.$$

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

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Topic: Unit 6: Further topics on random variables:Lec. 12: Sums of independent r.v.'s; Covariance and correlation / 3. Exercise: Discrete convolution

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[STAFF] X+Y=6

There is a typo in the solution. It is mentioned 4 instead of 6.

3 new 9