Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 7th edition, Global Edition
Extra Examples
Section 7.4—Expected Value and Variance

Extra Examples — *Page references correspond to locations of Extra Examples icons in the textbook.*

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p.464, icon at Example 2
#1. You roll a die. If a 5 or 6 shows, you win three points. If a 1, 2, 3, or 4 shows, you lose one point. Set up a random variable X that measures the number of points you win, and find the expected value of X.

See Solution

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p.464, icon at Example 2
#2. You roll a die four times. Let X be the random variable that counts the sum of the numbers rolled. Find $E(X)$.

See Solution

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p.464, icon at Example 2
#3. A 6-sided die has its sides labeled $1, 1, 2, 2, 2, 3$. If you roll the die once, what is the expected value of the number that shows?

See Solution

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p.464, icon at Example 2
#4. A multiple-choice exam consists of a series of questions, each with four possible responses. If you

answer a question correctly, you receive 1 point. If you answer a question incorrectly, you lose 1/3 point. If you do not answer a question, you neither lose not gain any points. What is the expected value of the number of points you receive on a question

(a) if you randonly choose an answer?

(b) if you can eliminate one of the four choices and randomly choose one of the other three choices?

See Solution

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p.471, icon at Example 11

#1. A fair coin is flipped three times. Let X be the random variable that counts the number of heads and let Y be the random variable that counts the number of tails. Then

$$p(X{=}0) = \frac{1}{8},\ p(X{=}1) = \frac{3}{8},\ p(X{=}2) = \frac{3}{8},\ p(X{=}3) = \frac{1}{8}$$
$$p(Y{=}0) = \frac{1}{8},\ p(Y{=}1) = \frac{3}{8},\ p(Y{=}2) = \frac{3}{8},\ p(Y{=}3) = \frac{1}{8}.$$

Determine whether X and Y are independent random variables.

See Solution

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p.471, icon at Example 11

#2. A coin is flipped and a die rolled. The sample space

$$S = \{(H,1),(H,2),(H,3),(H,4),(H,5),(H,6),(T,1),(T,2),(T,3),(T,4),(T,5),(T,6)\}.$$

Let X be the random variable defined as follows: $X = 1$ if H is obtained on the coin and 0 if T is obtained on the coin. Let Y be the random variable that counts the number of spots showing on the die. Determine whether X and Y are independent random variables.

See Solution

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p.474, icon at Example 14
#1. Two tetrahedral dice are rolled. (A tetrahedral die is a die with four faces, which are numbered $1, 2, 3, 4$. Let $X(i, j) = i + j$, where the first die shows i and the second die shows j. Find $E(X)$ and $V(X)$.

See Solution
