

Answer on Question #81794 – Math — Statistics and Probability

Question

The sides of a fair six-sided die are labeled with 1, 2, 3, 4, 5, and 6. Each side is equally likely to come up after each roll of the die. Independent rolls of the die are performed repeatedly until 3 or 6 comes up. Let X be the number of rolls up to and including the first time that 3 or 6 comes up. The expected value of X is

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. impossible to determine based on the given information
8. none of the above

Solution

Here we have a geometric distribution with $p = \frac{1}{3}$, $1 - p = \frac{2}{3}$.

The expected value of a geometrically distributed random variable X with $p = \frac{1}{3}$ is

$$E(X) = \frac{1}{p} = \frac{1}{1/3} = 3.$$

Answer: 3. 3.