

What is the expected value of X^2 ?

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The expected value of X^2 is a mathematical term that represents the average or predicted value of the squared outcomes of a random variable X . It is calculated by multiplying each possible outcome of X^2 by its respective probability, and then summing all of these values together. This value is used to estimate the central tendency or most likely result of X^2 , making it a useful tool in probability and statistics.

Calculate Expected Value of X^2

For a , denoted as X , you can use the following formula to calculate the expected value of X^2 :

$$E(X^2) = \sum x^2 * p(x)$$

where:

Σ : A symbol that means "summation"
 x : The value of the random variable
 $p(x)$: The probability that the random variable takes on a given value

The following example shows how to use this formula in practice.

Example: Calculating Expected Value of X^2

Suppose we have the following probability distribution table that describes the probability that some random variable, X , takes on various values:

X	P(X)
0	0.06
1	0.15
2	0.17
3	0.24
4	0.23
5	0.09
6	0.06

To calculate the expected value of X^2 , we can use the following formula:

$$E(X^2) = \sum x^2 * p(x)$$

$$E(X^2) = (0)^2 * .06 + (1)^2 * .15 + (2)^2 * .17 + (3)^2 * .24 + (4)^2 * .23 + (5)^2 * .09 + (6)^2 * .06$$

$$E(X^2) = 0 + .15 + .68 + 2.16 + 3.68 + 2.25 + 2.16$$

$$E(X^2) = 11.08$$

The expected value of X^2 is 11.08.

Note that this random variable is a discrete random variable, which means it can only take on a finite number of values.

If X is a continuous random variable, we must use the following formula to calculate the expected value of X^2 :

$$E(X^2) = \int x^2 f(x) dx$$

\int : A symbol that means "integration"
 $f(x)$: The continuous for the random variable X

When calculating the expected value of X^2 for a continuous random variable, we typically use statistical software since this computation can be more difficult to perform by hand.

The following tutorials explain how to perform other common tasks in statistics: