Answer on Question #46336 – Math – Statistics and Probability

Question.

Obtain the mean and variance of the continuous random variable X having the probability density function $f(x) = \begin{cases} 2x, 0 \le x \le 1 \\ 0 \; otherwise \end{cases}$.

Solution.

The mean is $EX = \int_{-\infty}^{+\infty} xf(x)dx = \int_0^1 2x^2 dx = \frac{2}{3}x^3|_0^1 = \frac{2}{3}$.

$EX^2 = \int_{-\infty}^{+\infty} x^2 f(x)dx = \int_0^1 2x^3 dx = \frac{2}{4}x^4|_0^1 = \frac{1}{2}$.

The variance is $VarX = EX^2 - (EX)^2 = \frac{1}{2} - \frac{4}{9} = \frac{1}{18}$.

Answer. $EX = \frac{2}{3}, \; VarX = \frac{1}{18}$.