Question #68578, Math / Statistics and Probability

Suppose a biological cell contains 400 genes. When treated radioactively the probability that a gene will change into mutant gene is 0.006 and is independent of the other genes. What is the approximate probability that there are at most 4 mutant genes after the treatment?

Answer.

Normal probability with $\boldsymbol{\mu = np = 0.006 * 400 = 2.4}$,

$$\boldsymbol{\sigma = \sqrt{np(1-p)} = \sqrt{400 * 0.006(1-0.006)} = 1.5445.}$$

$$\boldsymbol{P(X \leq 4) = P\left(Z \leq \frac{4-2.4}{1.5445}\right) = P(Z \leq 1.04) = 0.8508.}$$