Answer on Question #68541-Physics-Mechanics-Relativity

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?

Solution

The number of genes that do get mutated is represented by random variable that follows binomial distribution:

$$X \sim Bin(n = 400, p = 0.006)$$

The probability that there are at most 4 mutant genes after the treatment is

$$P(X \leq 4).$$

Using Excel:

$$P(X \leq 4) = BINOM.DIST(4,400,0.006, TRUE) = 0.9047.$$

Answer: 0.9047.