Conditions

An oil company is planning to drill three exploratory wells. the company estimates that each well, independent of each other, has a 30% chance of being successful.

Find the probability distribution of X, the number of oil wells that will be successful.

Suppose the first well to be completed is successful, what is the probability that one of the two remaining wells is successful?

Solution

Let's construct a table, which describes the probability distribution of random value X, the number of oil wells that will be successful.

X	0	1	2	3
P(X)	0,343	0,441	0,189	0,027

To calculate these P(X) let's use the Bernoulli's formula:

$$P_{n,m} = C_n^m p^m q^{n-m}$$

For X=0:

$$P_{n,0} = 1 \cdot 1 \cdot 0.7 \cdot 0.7 \cdot 0.7 = 0,343$$

For X=1:

$$P_{n,0} = \frac{3!}{1!\,2!} \cdot 0.3 \cdot 0.7 \cdot 0.7 = 0,441$$

For X=2:

$$P_{n,0} = \frac{3!}{2!\,1!} \cdot 0.3 \cdot 0.3 \cdot 0.7 = 0,189$$

For X=3:

$$P_{n,0} = \frac{3!}{3!\,0!} \cdot 0.3 \cdot 0.3 \cdot 0.3 = 0,027$$

Suppose 1st well is successful. Then the probability that one of two others are successful is 1 minus the probability of both are successful and both are failed:

$$1 - 0.3 * 0.3 - 0.7 * 0.7 = 0,42$$

Answer: The probability of one of two other well will be successful is 42%.