If the probability of hitting a target is 3/4 and 9 shots are fired independently, what is the probability of hitting the target once or not at all?

Solution:

Let the random variable X corresponds to the number of hits of a target out of 9 shots.
Here X ~ B(n, p), where
n = 9 - number of shots which are fired independently
p = P(hitting a target) = ¾ =0.75
$$P(X = r) = P(r) = {}^nC_r\, p^r q^{n-r}$$
q = 1-p
r=0,1,2,3,...,9
$$P(X = r) = P(r) = {}^9C_r\,(0.75)^r\,(1-0.75)^{9-r} = {}^9C_r\,(0.75)^r\,(0.25)^{9-r}$$
Required probability:
$$P(X \geq 1) = 1 - P(X = 0) = 1 - {}^9C_0\,(0.75)^0\,(0.25)^9 = 1 - (0.25)^9 = 0.9999962$$
$$P(X = 0) = 0.0000038$$

Answer:

The probability of hitting the target once is 0.9999962.
The probability of hitting the target not at all is 0.0000038.