

Assignment 2-probability and Random Variable

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Problem statement: The probability that student is not a swimmer is $1/5$. Then the probability that out of five students, four are swimmers is?

- a) ${}^5C_4(4/5)^4(1/5)$
- b) $(4/5)^4(1/5)$
- c) ${}^5C_1(4/5)^4(1/5)$
- d) None of the above

Solution: Let X be the number of swimmers.

$p = \frac{4}{5}$ (probability that student is swimmer) & $q = \frac{1}{5}$ (probability that student is not swimmer), $n = 5$ (number of students). From Bernoulli's distribution we know that,

$$P(X = r) = {}^nC_r p^r q^{n-r}$$

. Here, $p = \frac{4}{5}, q = \frac{1}{5}, n = 5$ and $r = 4$.
Therefore, $P(4) = {}^5C_4(\frac{4}{5})^4(\frac{1}{5})$.
Hence the answer is option **(a)**.