Chapter 9 Gaussian

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Q9.3.6: The probability that a student is not a swimmer is $\frac{1}{5}$ .Then the probability that out of five students, four are swimmers

1) ${}^5C_4 \left(\frac{4}{5}\right)^4 \frac{1}{5}$

2) $\left(\frac{4}{5}\right)^4 \frac{1}{5}$

3) ${}^5C_1 \frac{1}{5} \left(\frac{4}{5}\right)^4$

4) None of these

Solution: The pmf of X is,

Parameter	Value	Description
n	5	number of students
q	$\frac{1}{5}$	probability for not a swimmer
p	$\frac{4}{5}$	probability for a swimmer
k	4	number of swimmers

TABLE 4
GIVEN INFORMATION

$$p_X(k) = {}^nC_k p^k q^{n-k} \tag{1}$$

and the desired probability is

$$p_X(4) = {}^5C_4 \left(\frac{4}{5}\right)^4 \left(\frac{1}{5}\right)^{5-4} \tag{2}$$

Hence, option 1 is correct.