Assignment 3
AI1110:Probability And Random Variables
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12.13.5.9:On a multiple-choice examination with three possible answer for each of the five question,what is the probability that a candidate would get four or more correct answer just by guessing?
Solution:Given
let X be a random varible that measure number of correct answer.

Parameters	Description
X	X is a Random variable
$X = k$	k is Number of correct Questions
n	Total Number of Question
p	probability that Question is correct
q	probability that Question is incorrect

TABLE 0
DECRIPTION

X has binomial Distribtion

$$k := \{0, 1, 2, 3, 4, 5\} \tag{1}$$
$$n = 5 \tag{2}$$
$$p = \frac{1}{3} \tag{3}$$
$$q = \frac{2}{3} \tag{4}$$

$$\Pr(X = k) = \binom{n}{k} p^x q^{n-k} \tag{5}$$
$$= \binom{5}{k} \left(\frac{1}{3}\right)^k \left(\frac{2}{3}\right)^{5-k} \tag{6}$$

Probability that a candidate would get four or more correct answer

$$\Pr(X >= 4) = \Pr(X = 4) + \Pr(X = 5) \tag{7}$$
$$= \binom{5}{4} \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 + \binom{5}{5} \left(\frac{1}{3}\right)^5 \left(\frac{2}{3}\right)^0 \tag{8}$$
$$= 5\left(\frac{1}{81}\right)\left(\frac{2}{3}\right) + \left(\frac{1}{243}\right) \tag{9}$$
$$= \left(\frac{10}{243}\right) + \left(\frac{1}{243}\right) \tag{10}$$
$$= \left(\frac{11}{243}\right) \tag{11}$$