

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

Each Question has 3 possible answer

$$\Pr(\text{right}) = p = \frac{1}{3} \quad (1)$$

$$\Pr(\text{wrong}) = q = \frac{2}{3} \quad (2)$$

let X be a random variable that measure number of correct answer.

$X := \{0, 1, 2, 3, 4, 5\}$

Probability that a candidate would get four or more correct answer

$$\Pr(X \geq 4) = \Pr(X = 4) + \Pr(X = 5) \quad (5)$$

$$= \binom{5}{4} \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 + \binom{5}{5} \left(\frac{1}{3}\right)^5 \left(\frac{2}{3}\right)^0 \quad (6)$$

$$= 5 \left(\frac{1}{81}\right) \left(\frac{2}{3}\right) + \left(\frac{1}{243}\right) \quad (7)$$

$$= \left(\frac{10}{243}\right) + \left(\frac{1}{243}\right) \quad (8)$$

$$= \left(\frac{11}{243}\right) \quad (9)$$

Random Variable	Value	Description
X	5	5 Question are correct
	4	4 Question are correct
	3	3 Question are correct
	2	2 Question are correct
	1	1 Question is correct
	0	otherwise

TABLE 0

RANDOM VARIABLE DESCRIPTION

X has binomial Distribution

$$\Pr(X = x) = \binom{n}{x} p^x q^{n-x} \quad (3)$$

$$= \binom{5}{x} \left(\frac{1}{3}\right)^x \left(\frac{2}{3}\right)^{5-x} \quad (4)$$