Assignment

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Question 12.13.3.85
The probability of guessing correctly at least 8 out of 10 answers on a true-false type examination is
Solution:

Parameter	Value	Description
n	10	number of questions
p	1/2	correct answer
q	1/2	wrong answer

TABLE I
RANDOM VARIABLE DECLARATION.

Let X be a random variable which denotes the number of correct answers
The PMF of X is

$$\Pr(X = k) = {}^{n}C_k p^k q^{n-k} \qquad \forall k = 0, 1, 2...10 \tag{1}$$

And the CDF is given by

$$F_X(k) = \Pr(X \le k) \tag{2}$$

$$= \sum_{i=0}^{k} {}^{n}C_i p^i q^{n-i} \tag{3}$$

$$\Pr(X \ge 8) = 1 - \Pr(X \le 7) \tag{4}$$

$$= 1 - F_X(7) \tag{5}$$

$$= 1 - \sum_{i=0}^{2} {}^{10}C_i \left(\frac{1}{2}\right)^i \left(\frac{1}{2}\right)^{10-i} \tag{6}$$

$$= \frac{7}{128} \tag{7}$$