

Question 10.13.1.22 The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

Solution:

parameters	values	description
X	0	good egg
	1	bad egg
Y	$\sum_{i=1}^n X_i$	Binomial random variable
n	400	Total number of eggs
k		number of bad eggs
p	0.035	Probability of getting a bad eggs

TABLE 0
RANDOM VARIABLE

Let

$$\Pr(X = 0) = p \quad (1)$$

$$\Pr(X = 1) = 1 - p \quad (2)$$

$$(3)$$

The pmf of Y is given by:

$$Y \sim \text{Bin}(n, p) \quad (4)$$

$$p_Y(k) = \Pr(Y = k) \quad (5)$$

$$= {}^nC_k p^k (1 - p)^{n-k}, (1 \leq k \leq n) \quad (6)$$

The value of k for which maximises the probability gives the number of bad eggs.

k=14

Bad eggs = 14