

Quiz on the Binomial & Poisson Distributions

NO CALCULATORS

[1] The number of errors in a manuscript have a Poisson distribution with a mean of 3 errors per page.

[a] Write an expression for the probability that a randomly selected page has exactly 1 error.

[b] Write an expression for the probability that a chapter with 10 pages has exactly 25 errors.

[2] Roll three **four-sided** dice and count the number of \square s that show.

[a] What is the number of trials? $n =$ _____

[b] What is the probability of success? $p =$ _____

[c] What is the probability of failure? $q =$ _____

[d] Make a probability distribution table for this experiment. SHOW ALL YOUR CALCULATIONS BELOW.

X	0	1	2	3
P(X=x)				

CALCULATIONS:

$$P(X = 0) =$$

$$P(X = 1) =$$

$$P(X = 2) =$$

$$P(X = 3) =$$

CALCULATOR SECTION

name: _____

[3] 2% of the widgets produced by a certain machine are faulty. You randomly select 25 of the widgets and test to see how many are faulty. Find the following.

[a] the probability that none of the widgets is faulty

[b] the probability that exactly 1 widget is faulty

[c] the probability that at least 1 widget is faulty.

[d] If X = the number of faulty widgets in a random sample of 25 widgets, find the following:

[i] $E(X)$

[ii] $\text{Var}(X)$

[4] The number of flaws per square yard of fabric has a Poisson distribution with a mean of 0.2 flaws per square yard.

[a] Find the probability that a bolt of the material containing 100 square yards has more than 12 flaws.

[b] Find the probability that a bolt of the material containing 100 square yards has fewer than 20 flaws.

[c] If Y = the number of flaws per square yard, find the standard deviation of Y .