Answer on Question #46861 – Math – Statistics and Probability

Problem.

Because of economic conditions, a firm reports that 30% of its accounts receivable from other business firm are overdue. If an accountant takes a random sample of five such accounts, determine the probability that at least two accounts is overdue.

Solution:

The probability that an account is overdue equals $p = \frac{30}{100} = 0.3$.

The probability that an account isn't overdue equals $q = 1 - p = 1 - 0.3 = 0.7$.

The probability that in the sample of five accounts no accounts is overdue equals

$$P_0 = \binom{5}{0} p^0 q^5 = q^5 = 0.7^5$$

by Bernoulli's trial.

The probability that in the sample of five accounts exactly one account is overdue equals

$$P_1 = \binom{5}{1} p^1 q^4 = 5 \cdot 0.3 \cdot (0.7)^4$$

by Bernoulli's trial.

The that in the sample of five accounts less than two accounts is overdue equals

$$P_0 + P_1.$$

The that in the sample of five accounts at least two accounts is overdue equals

$$1 - (P_0 + P_1) = 1 - 0.7^5 - 5 \cdot 0.3 \cdot (0.7)^4 = 0.47178.$$

Answer: 0.47178.