Answer on Question #79537 — Math — Statistics and Probability

Question

Consider a sample of 10 randomly selected employees at an auditing firm. The probability that 3 employees in this sample have an honours degree is 0.215 while the probability that 4 employees in this sample have an honours degree is 0.251. Determine the probability that at least 2 employees in this sample have an honours degree.

Solution

P (3, 10) = 0.215

P (4, 10) = 0.251

P (>=2, 10) — ?

P (>=2, 10) = 1 – P (<= 1, 10) $= 1 - C_{10}^{1}p^{1}(1-p)^{9} - (1-p)^{10}$

$\mathrm{P}(3,10) = C_{10}^{3}p^{3}(1-p)^{7} = 120p^{3}(1-p)^{7} = 0.215$

$\mathrm{P}(4,10) = C_{10}^{4}p^{4}(1-p)^{6} = 210p^{4}(1-p)^{6} = 0.251$

$p^{3}(1-p)^{7} = 0.00179$

$p^{4}(1-p)^{6} = 0.001195$

$(p^{3}(1-p)^{6})(1-p) = 0.00179$

$(p^{3}(1-p)^{6})p = 0.001195$

$p^{3}(1-p)^{6} = 0.001195 + 0.00179 = 0.002985$

p = 0.001195 / 0.002985 = 0.4

P (>=2, 10) = $1 - 10p(1-p)^{9} - (1-p)^{10} = 1 - 0.04 - 0.006 = 0.954$

Answer: 0.954.