VI. A salesperson must visit 4 of 6 stores and order is important. That is, AB and BA represent different routes. How many routes are available to the salesperson?

$${}_NP_R = \frac{N!}{(N-R)!}$$

$${}_6P_4 = \frac{6!}{(6-4)!} = \frac{6\times5\times4\times3\times2\times1}{2\times1} = 6\times5\times4\times3 = 360$$

VII. Redo problem VI assuming order does not count. AB and BA are the same and count as one route. Be sure to use a formula and show all work.

$${}_NC_R = \frac{N!}{(N-R)!(R!)}$$

$${}_6C_4 = \frac{6!}{(6-4)!4!} = \frac{6\times5\times4\times3\times2\times1}{2\times1\times4\times3\times2\times1} = \frac{6\times5}{2\times1} = 15$$

VIII. How many different 3-person subcommittees can be chosen from an 8-person committee?

$${}_NC_R = \frac{N!}{(N-R)!(R!)}$$

$${}_8C_3 = \frac{8!}{(8-3)!3!} = \frac{8\times7\times6\times5\times4\times3\times2\times1}{5\times4\times3\times2\times1\times3\times2\times1} = 8\times7 = 56$$

IX. Three of 8 committee members must be chosen to give a speech. All 8 have very different personalities and order is important. How many different speaker arrangements are possible?

$${}_NP_R = \frac{N!}{(N-R)!}$$

$${}_8P_3 = \frac{8!}{(8-3)!} = \frac{8\times7\times6\times5\times4\times3\times2\times1}{5\times4\times3\times2\times1} = 8\times7\times6 = 336$$

X. How many 4-place random numbers can be generated from 10 digits? Repeating digits is allowed.

This is a special adaptation of the counting rule because with each choice you have 10 digits to choose from.

MNOP where all equal 10 is 10 x 10 x 10 x 10 = 10^4 = 10,000

XI. Six parts are to be inspected from a production process designed to have approximately 5% defective parts. Using the binomial formula, determine the probability of zero defects. Use a table to determine the probability of at least 2 defective parts. State the entire probability distribution. What is the probability of 2 defective parts?

A. The Poisson approximation of the binomial can not be used because n is not ≥ 30.

B.

$$P(x) = \frac{n!}{X!(n-x)!}p^x q^{n-x}$$

$$P(0) = \frac{6!}{0!(6-0)!}.05^0.95^{6-0} = \tfrac{1}{1}(1).95^6 = .7351 = 73.51\%$$

$$P(x \geq 2) = 1 - [P(0) + P(1)] = 1 - (.735 + .232) = 1 - .967 = .033 = 3.3\%$$

C. See page ST 1 for the entire distribution.

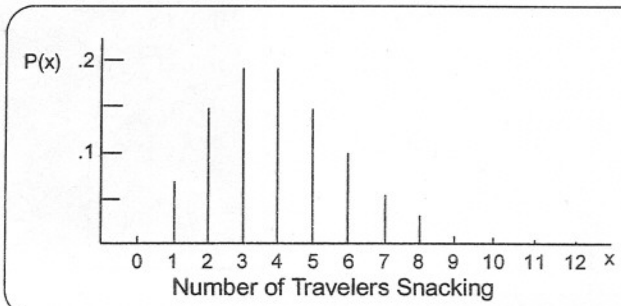
D. $P(x = 2) = .031$

XII. Approximately 4% of the estimated 100 travelers driving on route 128 will stop for a snack between 11:10 PM and 11:20 PM. Is the Poisson approximation to the binomial distribution appropriate for the solution of this problem? Use a table to determine the probability that less than 2 travelers will stop for a snack. Draw a graph of this distribution.

A Poisson approximation of the the binomial is appropriate.
n ≥ 30 as n = 100
np < 5 as np = .04 x 100 = 4

$\mu = np = (100)(.04) = 4$

$P(< 2) = P(0) + P(1) = .0183 + .0733$
$= .0916 = 9.16\%$



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