

Binomial and Poisson Distribution Calculations

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Select RUN mode from the main menu by using the arrow keys to highlight the RUN icon or pressing 1.



Binomial

$$P(x = X) = {}^n C_r p^r (1-p)^{n-r}$$

Poisson

$$P(x = X) = \frac{x e^{-\lambda}}{x!}$$

Combinations and Permutations - ${}^n C_r$ and ${}^n P_r$ respectively



OPTN



F6



F3

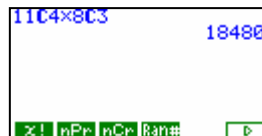
Example: How many arrangements are there of 8 people standing in a line?

Answer: $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 8!$ or
 ${}^8 P_8 = 40320$



Example: How many ways can we choose a committee of 7 people from a group of 11 women and 8 men if there have to be 3 men and 4 women on the committee?

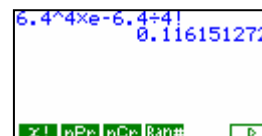
Answer: ${}^{11} C_4 =$ number of combinations of women.
 ${}^8 C_3 =$ number of combinations of men.
 Total number of ways of getting this committee is ${}^{11} C_4 \cdot {}^8 C_3 = 18480$



Example: A carpet manufacturer found that for every 10 carpet mats made there were 64 flaws found on inspection. Calculate the probability of having a carpet mat that has 4 flaws in it? [Assume a Poisson Distribution.]

Answer: The average flaw per carpet mat is $64/10 = 6.4 = \lambda$

$$P(x = 4) = \frac{6.4^4 e^{-6.4}}{4!} = 0.11615$$



[N.B. The Poisson Distribution can also be done in STAT mode on the CFX-9850GB Plus, FX-9750G Plus or the Algebra 2.0 models. See separate worksheet for this]