Basic probability computations on a TI-82, 83, or 84

Factorial: $n!$

Type the number
Press the **MATH** button and move left to select **PRB**. The 4th option down should be the factorial (!)

Example: In how many ways can 12 students line-up in a hallway? 12! = 479,001,600

Permutation: ${}_nP_r = \text{ways of arranging a sample of r items from a total of n items}$

Type the number of items from which you will sample
Press the **MATH** button and move left to select **PRB**. The 2nd option calculates combinations (nPr)

Example: Number of 4-digit numbers using each digit only once: ${}_{10}C_4 = \binom{10}{4} = 10\text{x}9\text{x}8\text{x}7 = 5040$

Combination: ${}_nC_r = \binom{n}{r} = \text{out of n items choose a sample of size r}$

Type the number of items from which you will sample
Press the **MATH** button and move left to select **PRB**. The 3rd option calculates combinations (nCr)

Example: In how many ways can we select 4 students out of 12? ${}_{12}C_4 = \binom{12}{4} = 495$

Binomial Distribution: $X \sim \text{binomial}(n, p)$ **where n = number of trials and p = probability of success**

To calculate $P(X = x) = \binom{n}{x} p^x (1-p)^{n-x}$, you need to calculate a binomial pdf

Press the **DISTR** button (located above the VARS button). Select option #0: binompdf
You enter **binompdf(n,p,x)**. n = number of trials, p = probability of success, x = number of wins

Example: What is the probability of correctly guessing 7 items on a 20-item multiple-choice test (each item has 4 choices)?
P(X = 7) = **Binompdf(20, 0.25, 7) = 0.1124061955**

To calculate $P(X \le x) = \binom{n}{x} p^x (1-p)^{n-x}$, you need to calculate a binomial cdf

Press the **DISTR** button (located above the VARS button). Select option #A: binomcdf
You enter **binomcdf(n,p,x)**. n = number of trials, p = probability of success, x = number of wins

Example: What is the probability of correctly guessing 7 or fewer items on a 20-item multiple-choice test (each item has 4 choices)?
P(X ≤ 7) = **Binomcdf(20, 0.25, 7) = 0.8981881431**

Example: What is the probability of correctly guessing more than 10 items on a 20-item multiple-choice test (each item has 4 choices)?
P(X > 10) = 1- P(X ≤ 10) = 1 - **Binomcdf(20, 0.25, 10) = 0.0039421417**

Geometric Distribution: $X \sim \text{Geometric}(p, k)$ **where p = probability of success and k = number of trials**

To calculate $P(X = k) = p(1-p)^{k-1}$, you need to calculate a geometric pdf

Press the **DISTR** button (located above the VARS button). Select option #D: geometpdf
You enter **geometpdf(p,k)**. p = probability of success, k= number of trials before first success

Example: On the multiple-choice test, what is the probability that your first correct guess will be on one of the first three items?
geometpdf(0.25, 3) = 0.578125