- Find permutation, combination, factorials.

(1) Calculate 12!
   type 12 (in the run screen) —–MATH—PRB—-CHOOSE No.4 !—-ENTER(brings you back to the run screen)—-ENTER—479001600

(2) Calculate P_5^{12}
   type 12—MATH–PRB–choose No. 2: nPr—ENTER(go back to the run screen)—type 5—ENTER—-95040

(3) Calculate
$$\binom{12}{5} = \frac{12!}{5!(12-5)!}$$
   type 12—MATH–PRB–choose No. 3: nCr—ENTER(go back to the run screen)—type 5—ENTER—-792

- Probability Distributions

(1) Binomial pmf
   $X \sim Bin(n, p)$
   $binompdf(n, p, x) = \binom{n}{x} p^x (1-p)^{n-x}.$

   Example: $X \sim Bin(10, .1)$, want to find $P(x = 2) = \binom{10}{2} .1^2.9^8.$

   2nd+distr–A:binompdf–ENTER–binompdf(10,.1,2)—.1937

(2) Binomial cdf
   $binomcdf(n, p, x) = P(X \le x)$

   Example: $X \sim Bin(10, .1)$, want to find $P(X \le 3) = \sum_{x=0}^{x=3} \binom{10}{x} .1^x.9^{10-x}.$

   2nd+distr–A:binomcdf–ENTER–binompdf(10,.1,3)—.9872

(3) Similarly, you can calculate pmf and cdf for geometric, poisson distributions.
   geometpdf(p, x)
   geometcdf(p, x)
   poissonpdf(λ, x)
   poissoncdf(λ, x)

- Standard Normal Distribution $N(0, 1)$

(1) Find probability $P(Z \le x)$
   Example: $P(Z \le 1.96) = .975.$
   2nd+distr—2:normalcdf(-1E99,1.96) (Note, to enter -1E -1 2nd , 99)
   Example: $P(-1.96 \le Z \le 1.96) = .95$
   2nd+distr—2:normalcdf(-1.96,1.96)

(2) Find Z value

Example: want to find Z such that $P(Z \leq z) = .975$

2nd+distr—3: invNorm $(.975) = 1.96$

- Draw Histogram

Click stat–edit–enter test 2 score under L1, enter 1's under L2. Go back to the screen, click 2nd stat plot—enter—choose type as histrogram, should be the third one—-click graph (note, if it doesn't work, you may need to check your window's setting, for our problem, you can set x from 30 to 100, y from 0 to 10)

- t distribution

(1) Find Critical Value

Example: $t_{(\alpha/2, df=n-1)} = t_{(.05/2, 47-1)} = 2.01$

MATH—0:solver–eqn:0=.025-2nd+distr—6:tcdf(x,1E99,46)—-enter—ALPHA+SOLVE

(2) Find P-value

Example: two sided test with degrees of freedom 46, $t_0 = 2.01$, P-value=$2P(t > 2.01) = 2(1 - P(t \leq 2.01))$. As we can see from previous example, the P-value should be equal to .05.

2(2nd+distr—6:tcdf(2.01,1E99,46))