

Distribution Function Help

This program calculates probabilities for some of the more important continuous distribution functions. It also calculates the power function and sample sizes for the normal and t-tests on means.

The Go buttons start the calculation, and the Q buttons closes the window.

The main menu functions are:

[Normal Probs](#)

[t distribution](#)

[Chi square distribution](#)

[F and beta distribution](#)

[Power functions and Sample Sizes](#)

If you like this program and use it regularly, please send \$10 US to

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Normal Probabilities

- n Probs: Enter a standard normal variable, z , and get the probability less than or equal to z .
- n Mean Std Probs: Enter a normal random variable, $X=x$, having mean, μ , and standard deviation, σ . Prob is the probability that $X \leq x$.

Percentiles

- n Quantile: Enter the probability, q . z is the value of a standard normal random variable having probability q less than or equal to it. It is the $100 \cdot q$ 'th percentile.
- n Inv Nm std: Enter the probability, $prob$, mean and standard deviation, σ . x is the value of a normal random variable with mean and σ dev. having probability $prob$ less than or equal to it.

t distribution

- n Prob: enter t, and the degrees of freedom, df. Returns $\text{prob} = P(T(\text{df}) \leq t)$
- n inverse t: enter prob, and the degrees of freedom, df. Returns t such that $\text{prob} = P(T(\text{df}) \leq t)$.

Non central t distribution

- n Non central t: enter t, the degrees of freedom, df, and the non-centrality parameter, nc(>0). Returns $\text{prob} = P(T(\text{df}, \text{nc}) \leq t)$. Non centrality parameter matches SAS usage.
- n nct quantiles: enter prob, the degrees of freedom, df, and the non-centrality parameter, nc(>0). Returns t such that $\text{prob} = P(T(\text{df}, \text{nc}) \leq t)$.

Chi-Square Probs

- n Chi-square: Input chi-square, chi, and degrees of freedom, df. Returns $\text{prob} = P(X(\text{df}) < \text{chi})$
- n Inv ChiSquare: Input prob, and degrees of freedom. Returns x such that $\text{prob} = P(X(\text{df}) < x)$

Non-Central Chi Square

- n NC ChiSquare: input non-central chi square variate, chi, the degrees of freedom, df, and the non-centrality parameter. Returns $\text{prob} = P(X(\text{df}, \text{nc}) < \text{chi})$. Note, noncentrality parameter is $2 \cdot \lambda$ in Abramowitz and Stegun equation 26.4.25. Handbook of Mathematical Functions. Also the noncentrality parameter matches the use in SAS.
- n Inv NCChiSq: Inverse non-central Chi-square, input prob, df, and nc. Returns x such that $\text{prob} = P(X(\text{df}, \text{nc}) < x)$

Gamma Distribution

- n Gamma: Input gamma variate, g, alpha, a, and beta, b. Returns $\text{prob} = P(G(a, b) < g)$.
- n InvGamma: Input prob, alpha, a, and beta b. Returns g such that $\text{prob} = P(G(a, b) < g)$

F distribution

n Fdist: input F variate, f, degrees of freedom df1,df2. Return $\text{prob} = P(F(df1,df2) < f)$.

n Invf: input prob, degrees of freedom df1,df2. Return f such that $\text{prob} = P(F(df1,df2) < f)$.

NonCentral F

n NonCentralF: input F variate, f, degrees of freedom df1,df2, and noncentrality parameter. Return $\text{prob} = P(F(df1,df2,nc) < f)$. The non-centrality parameter matches SAS.

n Ncf inverse: input prob, degrees of freedom df1,df2, and noncentrality parameter. Return f such that $\text{prob} = P(F(df1,df2,nc) < f)$. The non-centrality parameter matches SAS.

Beta

n Beta: input beta variate, x, alpha, a, and beta, b. Returns $\text{prob} = P(B(a,b) < x)$.

Power Functions and Sample Size

The power functions and sample size menus calculate the power of hypothesis tests and sample sizes for several well known statistical tests. The 1 sample tests compare means to a constant. The 2 sample tests compare two means. The last test compares two proportions.

The menus are fairly similar. You select the parameter to solve for by using a radio button. Then you input the other information needed to describe the test. Then press the go button.

[Normal Tests](#)

[T-tests](#)

[Compare Percentages](#)

Normal Tests

These calculate power and sample size for the 1 and 2 sample tests on normal means.

Z test 1 sample:

Select a left, right, or 2-sided alternative using the Sides radio button. Select the parameter to solve for using the 'Solve for' radio button. Enter the type 1 error, alpha, the standard deviation, and the size of the difference to detect. Enter the sample size if solving for the power, and enter power if solving for the sample size. Select the go button to calculate the selected parameter.

Z test 2 sample:

Select a left, right, or 2-sided alternative using the Sides radio button. Select the parameter to solve for using the 'Solve for' radio button. Enter the type 1 error, alpha, the standard deviation, and the size of the difference to detect. Enter the sample size if solving for the power, and enter power if solving for the sample size. Select the go button to calculate the selected parameter.

t Tests

TTest 1 Sample

Select a left, right, or 2-sided alternative using the Sides radio button. Select the parameter to solve for using the 'Solve for' radio button. Enter the type 1 error, alpha, the standard deviation, and the size of the difference to detect. Enter the sample size if solving for the power, and enter power if solving for the sample size. Select the go button to calculate the selected parameter.

TTest 2 Sample

Select a left, right, or 2-sided alternative using the Sides radio button. Select the parameter to solve for using the 'Solve for' radio button. Enter the type 1 error, alpha, the standard deviation, and the size of the difference to detect. Enter the sample size if solving for the power, and enter power if solving for the sample size. Select the go button to calculate the selected parameter.

Compare Proportions: p1-p2

Select the parameter to solve for using the 'Solve for' radio button. Enter the type 1 error, alpha, the proportions, p1 and p2. Enter the sample size if solving for the power, and enter power if solving for the sample size. Select the go button to calculate the selected parameter.

