The program may be used as a regular calculator.

- + to add
- - to subtract
- * to multiply
- / to divide
- ^ to raise to a power
- sqrt to square root; any other root, use a fractional exponent

To enter a data set

- c( )

The cursor will then appear inside the parenthesis and you’ll enter the data set, separating each number with a comma. Lastly, hit enter.

Name a data set

- name = c( )

Mean of a data set

- mean(name of data set) or mean(enter the data set)

Median of a data set

- median(name of data set) or median(enter the data set)

Sort data

- sort(name of data set) or sort(enter the data set)

Variance of a data set

- var(name of data set) or var(enter the data set)

Standard Deviation of a data set

- sd(name of data set) or sd(enter the data set)

Five Number Summary

- fivenum(name of data set) or fivenum(enter data set)

Factorial

- factorial(number)

For permutations, use the factorial command.

Combination

- choose(n, r)

Binomial Distributions

- \( P(X = k) = \text{dbinom}(k, n, p) \)
- \( P(X \leq k) = \text{pbinom}(k, n, p) \)
- \( P(X > k) = 1 - \text{pbinom}(k, n, p) \)

In the command, \( n \) = number of trials, \( k \) = number of successes and \( p \) = probability of success

Geometric Distributions

- \( P(X = n) = \text{dgeom}(n - 1, p) \)
- \( P(X \leq n) = \text{pgeom}(n - 1, p) \)
- \( P(X > n) = 1 - \text{pgeom}(n - 1, p) \)

where \( n \) = nth trial and \( p \) = probability of success

Normal Distributions

- \( P(X < b) = \text{pnorm}(b, \mu, \sigma) \)
- \( P(X > a) = 1 - \text{pnorm}(a, \mu, \sigma) \)
- \( P(a < X < b) = \text{pnorm}(b, \mu, \sigma) - \text{pnorm}(a, \mu, \sigma) \)

If the random variable is the standard normal variable, then leave \( \mu \) and \( \sigma \) blank.
• $P(X < c) = p$, command: `qnorm(p, \mu, \sigma)`
• $P(X > c) = p$, command: `qnorm(1 - p, \mu, \sigma)`
• $P(-c < X < c) = p$, command: `qnorm((p+1)/2, \mu, \sigma)`

If the random variable is the standard normal variable, then leave $\mu$ and $\sigma$ blank.

**Correlation**
- $\text{cor}(x,y)$.

**Coefficient of Determination**
- $\text{cor}(x,y)^2$

**Least Square Regression Line (LSRL)**
- `lm(y~x)`

**Residuals of the LSRL**
- `resid(lm(y~x))`

**Draw the LSRL through the scatterplot**
- `abline(lm(time~age))`

**Draw a horizontal line at 0 through the residual plot**
- `abline(0,0)`

**N random integers from a to b**
- `sample(a:b,N)`

**Scatterplot**
- `plot(name of x data set,name of y data set,pch=16,cex=2,cex.lab=2,cex.axis=2)`

In the command, `pch = 16` for filled dots, `cex = 2` for larger dots, `cex.lab = 2` for larger labels, and `cex.axis = 2` for larger tickmarks

**$z^*$**
- $z^* = \text{qnorm}\left(\frac{1 + \text{confidence level}}{2}\right)$
- $\text{qnorm}(\text{area to the left}) =$ critical value for the $z$-distribution
- $\text{pnorm}(z) =$ area to the left
- $1 - \text{pnorm}(z) =$ area to the right

**$t^*$**
- $t^* = \text{qt}\left(\frac{1 + CL}{2}, df\right)$
- $\text{qt}(\text{area to the left}, df) =$ critical value for the $t$-distribution
- $\text{pt}(t, df) =$ area to the left
- $1 - \text{pt}(t, df) =$ area to the right
Graphs

- `barplot(name of data set, names.arg=c("name of first bar", "name of second bar", etc))`

- `pie(name of data set, labels=c("name of first section", "name of second section", etc))`

- `stripchart(name of data set, method="stack", pch=16, cex=2, offset=1)`

  *This command gives a dot plot.*

  *In the command, pch = 16 for filled dots, cex = 2 for larger dots and offset for spacing out dots.*

- `stem(name of data set)`

- `hist(name of data set)`

- `boxplot(name of data set, horizontal=TRUE)`

  *In the command, horizontal=TRUE for a horizontal boxplot. The word true must be capitalized.*