

# TI-83, 83+, 83+Silver, 84, 84+, 84+Silver Graphing Calculator Applications and Programs

---

©2005, Jon Odell

The following represents some of the applications and programs available for the Texas Instruments 83-84 series of calculators. Many more programs are available.

Use the 2<sup>ND</sup>, MEM key to go to 2:MEM Mgmt/Del ENTER to examine your memory. RAM FREE indicates how much memory is available to run opened programs and ARC FREE indicates how much memory is available in the archives. Programs that are archived are indicated by a \* by the name of the program. One needs to check the memory needs of a program before opening as it may exceed the RAM available. If this is the case, then some programs need to be archived before programs can be opened. The TI-83 does not have this capability. Neither does the TI-82. Note that the newer the model, the more the memory capability of the calculator.

One can delete programs if they do not need them or want them. However, if there is ever a question that they might be needed, it is probably better to put the program in the archives. Use 2<sup>ND</sup> MEM – 5- ARCHIVE- and then pick the program using the PRGM key.

Applications are numerous on the newer model of the calculators and many use languages other than English. These can be downloaded or transferred if memory is available.

## **Transferring Programs**

**Do not transfer 82 to 83 or 83 to 82. Only transfer 83+ to 83+ or 84**

Get proper link cord. The 84 will not use the 83 cord, but the 83 will use the 84 cord. One should check memory to see if other programs exist already on the receiving calculator. Some “game” programs take lots of memory.

Insert into port in calculator and check to be sure that have pushed in all the way. Use 2<sup>ND</sup> LINK on both calculators. On the receiving calculator, arrow over the RECEIVE and press ENTER. Do this FIRST!!! Then on the

sending calculator, select ALL + which will send all programs. One can send selected programs using PRGM.. and choosing the programs desired. One can also send applications, but these take lots and lots of memory and lots of time. Once programs are selected, press ENTER. One can overwrite or choose other options for duplicate programs. Some programs have some age and it is best to have the latest edition of the program installed. When the transfer is proceeding, one sees the programs transferred.

---

## Categories of Programs – By Course

Note that Odell teaching concentration is Intermediate Algebra 098, College Algebra 116, and Basic Concepts of Mathematics 110 (a liberal arts class).

A star is by those programs used more often.

### **General:**

\*CTRZOOM

DEFAULTS ☆

DIVIDE

EVALUATE

\*FORMULAS

GRAPH

ID

\*MICKEY

SCRNSET

\*WINDCHILL

APPS – CtlgHelp

APPS – FunSci – also same as APPS Sci Tools

APPS – Inequalz

APPS – Organize

APPS - PuzzPack

APPS – Sci Tools

APPS – Start-up

APPS – StudyCrd

APPS - TimeSpan

APPS - Transfrm

**Algebra:**

ALG2 ☆

ALGEBRA ☆

\*ALGEBRAB\*

\*APLUS

BINOMIAL

COMSQ

DISTANCE ☆

\*EQUATION

FACTORS

\*FCTGORIAL

LINEABC

LINEMB

\*MATH99

\*PARABOLA

QUADB ☆

QUADFORM

\*QUADRATIC

RADICAL

SERIES ☆

SHIFT

\*SIERPINS

SIMULT ☆

\*SOLVER

VERTEX

APPS – ALG1CH5

APPS – ALG1PRT1 ☆

APPS – Conics 

APPS - Polysmlt

Apps Transfrm **DO NOT RUN THIS APPLICATION!** – when running, go to APPS menu and uninstall. This application causes many problems.

### **Geometry:**

CIRCLE

CIRCUM

CONE

CYLINDER

HERON

PRISM

PYRAMID

TRAPEZOI

APPS – AREAFORM



### **Trigonometry**

\*AAA

\*ANGLE

HERON

\*SAS

\*SINESHOW

\*SINETRAN

\*SOVTRNGL

\*SPIRAL

\*SSA

\*UNTCIRC

APPS - CabriJr

### **Finite**

\*FINANCE

\*GAME

\*HYPERGEO

\*LEONTIEF

\*PIVOT

\*PIVOT1  
\*SIMPLEX  
APPS - FINANCE

### **Statistics**

\*ANOVA  
\*CONTING  
\*CORR  
\*DECISION  
\*MEDIAN  
\*NORMAL  
\*PDIST  
PIE  
\*SIMULT  
\*STATTOOL  
\*STDNORM  
\*TWOWAY  
APPS – Prob Sim

### **Calculus**

\*NEWTON  
\*NUMINT  
\*RIEMANN  
\*SIMPSONS

### **Basic Concepts of Mathematics** – liberal arts mathematics

(algebra programs including ALGEBRA and ALG2)

BASECONV  
FACTORS  
\*HAMILTON  
PIE  
PRIMEC  
\*SIERPINS

(all geometry programs)

APPS – Finance  
APPS – ALG1PRT1  
APPS – AreaForm

APPS – FunSci – also same as APPS Sci Tools  
APPS – Prob Sim  
APPS – Sci Tools

## **Mathematics for Elementary School Teachers**

\*GRADER  
PRIMEC  
(all geometry programs)  
Apps - Prob Sim  
Apps - AreaForm

## **Chemistry**

APPS – Periodic ☆

---

---

### **APPS**

Useful APPLICATIONS –

**Finance** – extremely complex application and does many calculations involving finance including annuities. However, one needs to be careful on input of data, especially PMT as this is normally used as a negative number.

**ALGCH5** – Provides a review of systems of equations  
See problems modeled using linear systems

- Investigate solutions with graphs and tables
- Review solving linear questions with algebraic methods of substitution and elimination

**ALG1PRT1** – Application is very useful to review relationships of number systems and characteristics of rational and irrational numbers. It also gives introductions to solving linear equations. Tends to run a bit slow.

**AreaForm** – Application provides practice and formulas on rectangle, square, parallelogram, triangle, trapezoid, and circle.

CBL/CBR – used in connecting to device to collect data

Cabri Jr. – a geometry program used for discovery of concepts. Use geometry Sketch Pad program on a computer instead of this for more practice.

- Performs analytic, transformational and Euclidean geometric functions
- Build geometric constructions interactively with points, a set of points for locus, lines, polygons, circles, and other geometric objects
- Alter geometric objects on the fly to see patterns, make conjectures, and draw conclusions.

**Conics** – is a very useful for practice in College Algebra or Calculus. Does circle, ellipse, hyperbola, and parabola.

CtlHelp – is somewhat awkward but does provide help on catalog functions. When running to catalog and press + sign when cursor next to function.

**FunSci** – is a significant figure calculator and unit converter, among other things. Unit converter is the most useful.

Inequalz – is an application to graph inequalities in two variables. It does have problems that the icons do not go away easily and one needs to quit the program to get it back to normal. Run the application and go to 2 Quit Inequal to get rid of icons. Not the most useful of applications.

Enter inequiiie3s using symbols

Plot inequalities, including union and intersection shades

LogIn – not useful

Organize – Can generate monthly calendars – use a notebook unless you really like this technology.

**Periodic** – Extremely useful for chemistry – periodic table – with a list of all elements and symbols

Graphical representation of the periodic table of elements

Includes 15 properties and facts about the 109 known elements

Graphs of the periodic nature of the elements.

PolySmlt – supposedly finds polynomial roots but does not like complex roots. It also has a simultaneous equation solver, but other opportunities on calculator are better.

**Prob Sim** – simulates probability events including tossing coins, rolling dice, picking marbles, spinning spinner and drawing cards and random numbers.

PuzzPack – provides some puzzles that are like games.  
A fun game for building estimation and problem-solving skills.

**Sci Tools** is the same as Fun Science, which is a significant figure calculator and unit converter, among other things. Unit converter is the most useful. Perform unit conversions.

Added features include constants and conversions, a significant figure calculator, a data plotting wizard and a vector tool.

**Start-up** – is a program in conjunction with the program ID that can identify the ownership of the calculator. ID needs to be edited with the name of the owner and other information needed.

StudyCrd – is a way to do study cards – do your homework and leave this alone.

- Create flash cards for tests or review and practice with the study Cards
- Prepared flash cards can be downloaded from ti.com

Transfrm – **DO NOT RUN THIS AS PROBLEMS OCCUR.** Restart application and uninstall.

---

---

## **Description of Programs**

**Programs in Bold are the more commonly used in Professor Odell's Classes**

\***AAA** – Solving of triangles by angle-angle-angle

**ALG2** – Algebra program

**QUAD** – solves quadratic equations for exact values both real and imaginary. Very good

**RAD** – simplifies radicals

**SYSTEM** – solves 2 and 3 variable systems of equations

**FORM** – converts general to standard form of quadratic equations



**LINE** - Uses slope intercept, point slope, standard form, two points to give equation of line.

**SOLVER** – Solves linear equations

\*ALGEBRAB – algebra program that requires a very large memory. Works best on a 82

**ANGLE** – Draws an angle either radians or degrees

**ALGEBRAA – written by Professor James Jones**

**Quadratic Equations B** – The user may either enter the coefficients from the quadratic equation in standard form, or find the intercepts for the expressions graphed under  $Y_1$  or  $Y_2$ .

**Greatest Common Factor** – Enter a list of natural numbers separated by commas. Remember that lists must be enclosed in braces { } The result returned is the GCF of the numbers.

**Factor a trinomial** – This program will factor a trinomial. It uses the ac method of factoring and returns the result in factored form with grouping symbols.

**Synthetic Division** – Enter a list of real numbers separated by commas. Remember that lists must be enclosed in braces { } Then enter a value for  $x = a$ . The value returned will be a list which has been synthetically divided by  $x - a$ .

**Cramer's Rule** – Enter each equation as a list separated by commas. Remember that lists must be enclosed in braces { }. The program determines the number of lists to request the user for based upon the number of values entered in the first list. The results are stored in a matrix and then Cramer's Rule is applied to find the values of each of the variables. Any size system of linear equations may be entered up to the available memory of the calculator.

\*ANOVA program written by Professor James Jones

performs a one-way Analysis of Variance. List 1 must contain the means of the samples, list 2 must contain the sample variances, and list 3 must contain the sample sizes. Note that the three lists must be

the same size. The user is reminded of these requirements when running the program.

The grand mean is displayed, followed by the sum of squares, degrees of freedom, and mean sum of squares for the between group and within group. The total sum of squares and degrees of freedom, along with the F test statistic is also shown.

Upon completion, the program will give the user the chance to run the Scheffe test if the sample sizes are different or the Tukey test if the sample sizes are the same. All possible pairs are compared.

\*APLUS – Quadratics works but graphing and area do not. – Does not do non-real roots of quadratics

**BASECONV** – Converts base ten to different bases – does base 16, does base 12 with A, and B, instead of t and e

**Does not do base 3, 6, 7**

**BINOMIAL** – Expands a binomial – a bit awkward to do. Note that Professor Jones has a BINOMIAL program that computes a binomial probability. One cannot have two programs with the same name.

**Circle** – Calculates area of a circle

**CIRCUM** – calculates circumference of a circle.

**COMPSQ** – Practice on completing the square

**CONE** – Calculates volume of a cone.

\*CONTING program written by Professor James Jones

This program completes a test for independence using a contingency table. The observed frequencies must be contained in matrix [A] and the result is a test statistic having a chi-square distribution.

When the program is done running, the following variables are defined:

- List 1 contains the observed frequencies
- List 2 contains the expected frequencies
- List 3 contains the row totals
- List 4 contains the column totals

\*CORR – calculates correlation coefficients

\*CTRZOOM – controls zoom – leave archived

**CYLINDER** – calculates volume of cylinder

**DEFAULTS** – highly useful program

**Resets calculator to “factory” settings.**

Use when all other efforts seem to fail.

**DISTANCE** – Converts the distance between two points – does not give exact values but decimal approximations.

**DIVIDE** – Will do division to more decimal places than calculator can do in normal float mode.

\*EQUATION – solves linear equations – not especially good with other type of equations.

**EVALUATE** – Evaluate expressions in Y1

Works very well for a variety of values of x that are not suitable for a table.

**FACTORS** – Lists all of the factors of a natural number

\***FACTORIAL** – Determine the factorial value of numbers larger than 70.

\***FINANCE Program written by Professor James Jones**

is a menu driven program for financial calculations. The user selects the item to find and the program asks for the information necessary to compute the answer.

- Simple Interest – can find the interest, the principal, the rate, or the time.
- Compound Interest – can find the amount, the principal, the periodic rate, the number of periods, or the effective rate.
- Future Value – Can find the future value, the payment, the number of periods, or the periodic rate.
- Present Value – Can find the present value, the payment, the number of periods, or the periodic rate.

Very useful but does use a large amount of memory.

\***FORMULAS** – contains lots of formulas. Almost every program has to be archived to allow enough memory for this program to work.

\***GAME** Program written by Professor James Jones

is a program that solves an (mxn) to person, zero-sum game. The payoff matrix for the row player must be in ANS upon running the program. The optimal row and column strategies are returned as well as the value of the game.

The program checks for strictly determined games and recessive rows and columns. Requires a large amount of memory.

\***GRADER** – a method of keeping track of grades – requires large amount of memory. Leave archived

**GRAPH** – Helps to find YMIN and YMAX when you give in XMIN and XMAX. Designed for the 82. The Zoom Fit works in a similar manner if one inputs XMIN and XMAX in original window.

\***HAMILTON** – uses the Hamilton method for appropriating seats – incomplete program 12/23/05

**HERON** – given 3 sides of a triangle, determine the area of a triangle.

\***HYPERGEO** program written by Professor James Jones

This program gives the hypergeometric probability function. It asks for two lists. Note that lists must be enclosed in braces { } of n and ra values.

The individual n's must add to be the total number of objects and the individual r's must add to be the total number being chosen.

The probability is returned both as a fraction and a decimal. The numerator of the probability is contained in N and the denominator in D.

**ID** – allows screen to show the ID of the owner. Use in conjunction with the APPS application Startup. Needs to be reprogrammed for the owner's name.

\***LEONTIEF** Program written by Professor James Jones

This is a program which returns the input matrix X from a Leontief Input-Output model  $X = MX + D$

Instructions are displayed when running the program to remind one of the usage.

- M = Technology Matrix (square matrix) must be saved in [A]

- D = Demand Matrix (column vector) must be saved in [D]
- X = Input Matrix (column vector)

The solution is  $X = (I-M)^{-1} * D$

LINEABC –  $ax + by = c$  will graph this line – be sure to set window first.

LINEMB – Given the equation  $y = mx + b$  the program will sketch a graph.

\*MATH99 – Does algebra including quadratics, Pythagorean, slope, primes, radical simplification, systems, plus, volume of sphere, pyramid, cone, cylinder, distance, area of triangle, circle, regular polygon, science of percent error and temperature conversions

Requires lots of memory.

Program is worth removing from archives if possible.

\*MEDIAN – a probability program

\*MICKEY – draws Mickey Mouse

\*NEWTON – a calculus program

\*NORMAL – a statistics program

\*NUMINT program written by Professor James Jones

This is a menu driven program which finds area under curves using different techniques of numerical integration.

Enter the function into  $Y_1$

The techniques one can use are:

- Left hand endpoints
- Right hand endpoints
- Midpoints
- Simpson's Rule
- Trapezoid rule

\*PARABOLA – useful practice in recognizing standard form of parabola from graphs drawn. Used in College Algebra

\*PDIST program written by Professor James Jones

This program computes the mean, variance, and standard deviation of a probability distribution. List 1 should contain the x values and list 2 should contain the probabilities. The program reminds the user of this.

The data is not checked to make sure it conforms to a probability distribution (the probabilities are between 0 and 1 and the sum of the probabilities is 1) If the variance turns out negative (a really good sign that something is wrong) then a corrective measure is suggested.

**PIE** – constructs a “pie” or circle graph.

**PIVOT Program** – written by Professor James Jones

This program requires a matrix to be the value of ANS. A row and column in the matrix is then requested. The element in this position will be made into a one and other elements in that column will be turned into zeros by applying the elementary operations.

Since this program requires the matrix to be in the ANS before running, the program can be executed again on the reduced matrix, simply by hitting the ENTER key. This makes it very easy and quick to reduce the entire matrix.

Matrices are returned in fractional form.

**PIVOT1** – written by Professor James Jones is the program which actually perform the pivot. IT is called by the PIVOT, SIMPLEX, and GAME programs and never should be called directly. When using these programs, be sure PIVOT1 is unarchived.

**PRIMEC** – determines the prime factorization of a natural number

**PRISM** – Calculates the volume of a prism

**PYRAMID** – Calculates the volume of pyramid

**QUADB** – is a very good quadratic equation program. Solves for decimal approximations including imaginary roots and sketches a graph.

**QUADFORM** – solves quadratic equations and graphs and gives sum and product of roots and discriminant. The program is somewhat slow as it does a lot.

\***QUADRATIC** – solves quadratic equations. Other programs are better.

**RADICAL** – simplifies radicals

\*RIEMANN – a calculus program

\*SAS – solves a triangle given side, angle, side. The program is used in trigonometry.

\*SCRNSET – Sets the factor for zooming. Note the default is a factor of 4.

**SERIES** written by Professor James Jones, is a menu driven program which contains a collection of algorithms for sequences and series.

You can use the program to

- Find the general term of an arithmetic sequence when the first term, common difference, and number of terms are known.
- Find the sum of an arithmetic sequence when the first and last terms are known.
- Find the sum of an arithmetic sequence when the first term, common difference, and number of terms are known.
- Find the general term of a geometric sequence when the first term, common ratio and the number of terms are known.
- Find the sum of a geometric sequence when the first term, common ratio, and number of terms are known.
- Find the sum of an infinite geometric sequence when the first term, common ratio and number of terms are known.

This is an excellent program for College Algebra.

\*SHIFT – a program for shifting parabolas and gives practice in use of standard form of quadratics.

\*SIERPINS – constructs a fractal, Sierpinsky triangle

\*SIMPLEX program written by Professor James Jones

This program will apply the Simplex procedure from Linear Programming to a matrix. The tableau to apply the Simplex technique to must be in ANS.

The program automatically selects the pivot element based upon the rules of the Simplex techniques. The resulting tableau is displayed in

fractional form and the program sits waiting for the user to press the ENTER key. The program then proceeds with the next tableau until done.

The program only does standard maximization problems. Standard minimization problems must be converted to the Dual problem, and then the program ran. Non-standard maximization, or minimization problems are not support directly by the program, although is possible to fudge and use the PIVOT program.

\*SIMPSONS – used in calculus

\*SIMULAT program written by Professor James Jones

This program is menu driven which allow the user to simulate the following common probability events:

- Flipping one or more coins a fixed number of times.
- Rolling one or more dice a fixed number of times.
- Numbers having a uniform distribution with a given maximum and minimum.
- Create a Histogram.

Each of the first three options returns the x values in list 1 and the frequencies in list 2. List 2 is displayed when the program exists.

The histogram routines examine the data and pick suitable limits for the viewing window.

**SIMULT** – Solves simultaneous equations. An excellent program for Intermediate Algebra and College Algebra.

\*SINESHOW – used in trigonometry for practice

\*SINETRAN – used in trigonometry for practice

\*SLVTRNGL – used in trigonometry to solve triangles

\*SOLVER – used to solve equations

\*SPIRAL – used in trigonometry

\*SSA – used in trigonometry to solve side, side, angle triangles.

\*STATTOOL – used in statistics

\*STDNORM program written by Professor James Jones



is a menu driven program for working with the standard normal distribution. It will:

- Given an area in the tail, find the z-score.
- Given a z-score, find the area in the tail.

TRAPEZOD – calculates the area of a trapezoid

\*TWOWAY – used in statistics

\*Unit Circle – used for practice in trigonometry

\*Vertex – used in algebra when studying parabolas

\*WINDCHILL – uses a graph to calculate wind-chill temperature given a temperature and wind speed. Have to interpret a graph.