CALCULATOR TRICKS AND TIPS ALGEBRA 2

MATHPRINT vs CLASSIC

If you have a calculator with a newer operating system, you will have a choice of either MATHPRINT or CLASSIC print. Use the **MODE** key and arrow down to the next screen to change your calculator to the type of print you prefer. If you do not have a "next" at the bottom of the screen when you hit MODE, you have an older operating system and all of your print will be in CLASSIC.

```
NORMAL  SCI  ENG
FLOAT  0 1 2 3 4 5 6 7 8 9
RADIAN  DEGREE
FUNC  PAR  POL  SEQ
CONNECTED  DOT
SEQUENTIAL  SIMUL
REAL  a+bi  re^θi
FULL  HORIZ  G-T
        ↓NEXT↓
```

```
          ↑BACK↑
MATHPRINT  CLASSIC
n/d  Un/d
ANSWERS: AUTO  DEC  FRAC
GOTO FORMAT GRAPH:     YES
STAT DIAGNOSTICS: OFF  ON
STAT WIZARDS: ON  OFF
SET CLOCK 05/31/52 7:34PM
```

1) Basic Typing

ALWAYS USE PARENTHESES!

   a. **Radicals**

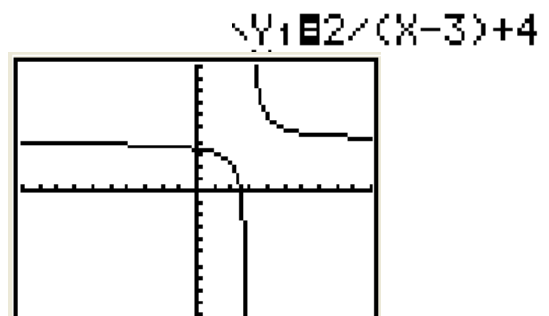   *Example 1:* Evaluate $\sqrt{48} - 2\sqrt[3]{10}$

   b. **Exponents**

   Example 2: Evaluate $81^{\frac{3}{4}} - 9^{\frac{1}{2}}$

   `81^(3/4)-9^(1/2)`

   c. **Rational expressions and functions**

   Example 3: Graph $g(x) = \dfrac{2}{x-3} + 4$

   `\Y1■2/(X-3)+4`

   d. **Logs – change of base**

   Example 4: Evaluate $\log_3 54$

   `ln(54)/ln(3)`

2) Graphing Functions

a. **Entering a function**
   All functions should be entered into your **Y=**

b. **Adjusting your screen to fit:**
   You should start all of your graphs with **ZOOM 6**. This will give you a standard 10 by 10 screen shot. If you need to focus on certain areas of your graph, you can use **ZOOM IN, ZOOM BOX,** or **ZOOM FIT.** Note that if you want to find zeros for a function they must be visible on the screen.

c. **Finding Zeros**
   2nd TRACE (CALC), #2 (ZERO). For each zero you are finding you must first get your cursor on the left of the zero, hit ENTER, then get your cursor on the right of the zero, hit ENTER, ENTER. Note that your *y* values must always change from negative to positive or from positive to negative in order to find a zero. The order of this will change depending on which zero you are trying to find. See the example below:
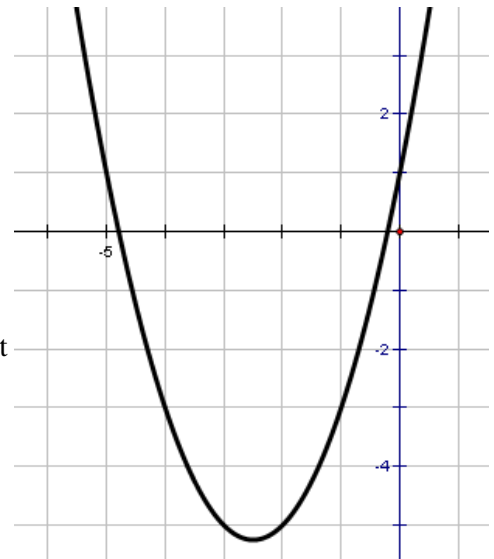
   Example 5: Find the zeros for the function
   $$f(x) = x^2 + 5x + 1$$

d. **Finding minimums and maximums**
   2nd TRACE (CALC), #3 or #4
   Again, you need to use your left and right arrow keys to make sure that you are on the left and then the right of the minimum or maximum. Find the minimum of example shown above. Remember that your min or max will be the *y* value in your ordered pair.
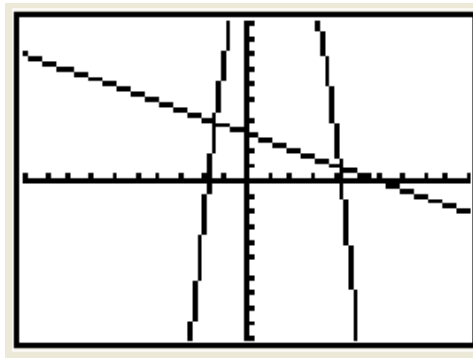
3) Finding Intersection Points
2nd TRACE (CALC), #5 (INTERSECT)

a. Type your equations into your Y_1 and Y_2. Graph the functions and be sure you can see the intersection points on your screen.

b. Use **2nd TRACE (CALC), #5 (INTERSECT), ENTER, ENTER, ENTER**. The calculator will automatically put the cursor on the different equations, but if you need to see what equation it is selecting, look at the top of the screen. Note: The calculator will give you the closest intersection point to your cursor, so if you are finding multiple points of intersection you will need to move your cursor close to the intersection point you are interested in finding.

Example 6: Find the intersection points for the system:
$$\begin{cases} y = -2x^2 + 5x + 15 \\ y = -\dfrac{1}{2}x + 3 \end{cases}$$

```
\Y1 = -2X²+5X+15
\Y2 = -(1/2)X+3
```

4) Graphing data

STAT and 2nd Y= (STATPLOT)

a. Entering the data
STAT – EDIT
This will get you to your lists. To clear a list, arrow up so that the L_1 is highlighted, hit **CLEAR**, and then arrow down. Note that your data will not disappear until you arrow back down.

b. Plotting the data
2nd Y= (STATPLOT)
Make sure your Plot 1 is turned on and the scatterplot option is selected.
ZOOM 9 – this will adjust your screen to fit the data you have entered into your lists.

c. Calculating a curve of best fit
Once your data is entered in your lists and you need to calculate a curve of best fit, hit **STAT**, then **CALC**. You will get a menu that contains regression equations. You should have looked at your data first to determine which type of curve your data appears to fit. The primary regression equations that we use in Algebra 2 are listed below. ***Sketch a graph of what each one looks like.***

Quadratic	Cubic	Quartic	Exponential	Logarithmic
(QuadReg)	(CubicReg)	(QuartReg)	(ExpReg)	(LnReg)

CLASSIC (Old Operating System)   **MATHPRINT (New Operating System)**

```
QuadReg Y1
```

```
  QuadReg
Xlist:L1
Ylist:L2
FreqList:
Store RegEQ:Y1
Calculate
```

d. Getting the equation of the curve of best fit into your y=
Once you select your curve of best fit and *before* you hit ENTER to calculate the equation, select **VARS, Y-VARS, ENTER, ENTER**. This will put your calculated equation into your Y_1. Make sure you have cleared out your Y_1 first or the calculator will put the new equation in after whatever you already had in there. Once your equation is in your Y= then you can use the table function to find particular values for the function.

5) Solving Systems with Matrices

Method 1: $[A]^{-1}[B]$

- Enter your coefficient matrix into Matrix A: **MATRIX, EDIT, A**. You will need to change the dimensions as needed.
- Enter your answer matrix (right side of matrix equation) into Matrix B: **MATRIX, EDIT, B**
- **2nd MODE (QUIT)**
- The command you need to put into your home screen is $[A]^{-1}[B]$. Steps are:

  MATRIX, ENTER (this will "Name" Matrix A in your home screen)
  x^{-1}
  MATRIX, down arrow, ENTER (this will "Name" Matrix B in your home screen.

Method 2: rref[A]

- Enter your matrix using *all* coefficients and the numbers on the right side of the system.
- **MATRIX, MATH, B (rref), MATRIX, ENTER** (this names the matrix you are computing reduced row-echelon form for). Your answer will be in the last column of the matrix.

Note: You can turn any decimal answer into fraction form using **MATH, ENTER, ENTER**

$$4x + 2y + 5z = -1$$

Example 7: Solve the system: $12x - 3y + 5z = 1$

$$-2x + 9y + 7z = 15$$

```
MATRIX[A] 3 ×3      MATRIX[B] 3 ×1                    rref([A]
[ 4    2    5   ]   [ -1          ]
[ 12   -3   5   ]   [ 1           ]
[ -2   9   7    ]   [ 15          ]

              [A]-1[B]
```

6) Evaluating Sums of Sequences

- **2nd STAT (LIST), MATH, #5 (sum)**
- **2nd STAT (LIST), OPS, #5 (seq)**
- Enter 4 things: **your expression** (formula, rule), **X, lower limit, upper limit**
- **NOTE:** on the newer operating systems you will get a menu that looks like the one listed below. Fill in the same information for Expression (formula), variable (X), start (lower limit), and end (upper limit). You do not need to enter anything in the "step" or "paste" fields – just keep hitting enter until you get your answer!

   Expr:
   Variable:
   start:
   end:
   step:
   Paste:

Example 8: Evaluate $\displaystyle\sum_{n=2}^{6} 3^{n-1}$

CLASSIC:
```
sum(seq(3^(X-1),
X,2,6)
```

MATHPRINT:
```
Expr:3^(X+1)
Variable:X
start:2
end:6
step:■
Paste
```

7) Complex numbers

Go to the **MODE** and change from **REAL to a+b*i*** . This will put your calculator in complex mode so that you can compute expressions with *i* in them.

Example 9: Simplify $(4-5i)^3$

$(4-5i)\text{^}3$
CLASSIC

$(4-5i)^3$
MATHPRINT

8) Statistics

Command	How to type it in	Example	When to use it	What you get from it
normalcdf	**2nd VARS (DISTR) #2**	**normalcdf(-99,1.5)** This means "find the percent under the normal distribution curve up to the zscore of 1.5."	When looking for a percentage between two *z* scores.	A decimal – move the decimal place two spots to the right to turn it into a percent
invnorm	**2nd VARS (DISTR) #3**	**invnorm(.25)** This means "find the zscore for the lower 25% of the normal distribution curve."	When given a percent and you are looking for a *z* score.	A *z* score
$_nC_r$	**MATH, PRB, #3**	$5\ _nC_r\ 2$ This means "find the number of combinations if you take 2 from a sample of 5."	When determining the number of combinations (ways) an event can occur.	A number that represents the number of ways an event can occur when order is not important.
$_nP_r$	**MATH, PRB, #2**	$5\ _nP_r\ 2$ This means "find the number of permutations if you take 2 from a sample of 5."	When determining the number of ways an event can occur when order is important.	A number that represents the number of ways an event can occur when order *is* important.
1-Var Stats	**STAT, CALC, #1** **CLASSIC (Old Operating System)** 1-Var Stats x̄=31.8 Σx=318 Σx²=18338 Sx=30.23169786 σx=28.68030683 ↓n=10 1-Var Stats ↑n=10 minX=2 Q₁=6 Med=25 Q₃=45 maxX=98	You must first have data typed into your L₁. 1-VAR Stat **MATHPRINT (New Operating System)** **1-Var Stats** List:L₁ FreqList: Calculate **1-Var Stats** x̄=31.8 Σx=318 Σx²=18338 Sx=30.23169786 σx=28.68030683 ↓n=10 **1-Var Stats** ↑n=10 minX=2 Q₁=6 Med=25 Q₃=45 maxX=98	When looking for the mean, median, standard deviation, variance, etc. *Data Used for these statistics:* **5, 15, 6, 45, 2, 35, 98, 12, 55, 45**	*Mean:* $\bar{X}$, μ *Standard Deviation:* σx *Median:* Med *Variance:* **VARS, STATISTICS, #4** This will bring up the standard deviation symbol – square it to get the variance. σx² 822.56