Integrated Algebra -  

Graphing Calculator Crash Course

Over the past few months, we have used the graphing calculator to help us graph functions and perform a variety of calculations. The graphing calculator also has uses for us that we have not explored in class. This “crash course” outlines the main uses of the graphing calculator for the upcoming Regents Examination.

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**Basic Calculator Functions**

**✓ STORE values on your calculator**

Press ON
Press any number to be stored
Press STO
Press \(X, T, \Theta, n\)
Press ENTER

The value is now stored for \(X\). This value will remain stored in your calculator until you store a different value or clear the memory/RAM of the calculator.

**✓ ABSOLUTE VALUE**

Press ON
Press MATH
Press \(\rightarrow\) highlight “NUM”
Press ENTER for abs
Press the numbers or variables for the expression
Press ENTER

**✓ CONVERT fractions to decimals**

Press ON
Press enter the fraction into your calculator using the division sign
Press MATH
Press 2
Press ENTER

**✓ CONVERT decimals to fractions**

Press ON
Press enter the decimal form of a number into your calculator
Press MATH
Press ENTER
Press ENTER

**OR**

After performing a calculation and the result is a decimal on the screen
Press MATH
Press ENTER the screen will display “ANS \(\rightarrow\) FRAC”
Press ENTER
✓ **ALPHA KEYS**
   Press  ON
   Press  ALPHA
   Press  the button indicating the desired letter (letter will be a green color)

✓ **Typing Multiple Letters**
   Press  ON
   Press  2^nd
   Press  ALPHA (This lets you type many letters with pressing ALPHA each time.)

✓ **Square or Exponent of 2**
   Press  ON
   Press  any number or variable that is raised to the second power or an exponent of 2
   Press  $x^2$
   Press  ENTER

✓ **Square Root of a Number**
   Press  ON
   Press  2^nd
   Press  $x^2$
   Press  any number or variable
   Press  ENTER

✓ **Cube or Exponent of 3**
   Press  ON
   Press  any number or variable that is raised to the third power or an exponent of 3
   Press  MATH
   Press  3
   Press  ENTER

✓ **Cube Root of a Number**
   Press  ON Press
   MATH
   Press  $\left(\frac{3}{\sqrt[3]{\cdot}}\right)$
   Press  any number or variable
   Press  ENTER

✓ **Any Exponent**
   Press  ON
   Press  any number or variable that is raised to a power/exponent
   Press  $\text{exponent}$
   Press  the number corresponding to the exponent
   Press  ENTER
✓ *PI*

Press **ON**
Press 2<sup>nd</sup>
Press \( \pi \) (you are accessing the “PI” key)

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**Trigonometry**

✓ *CONVERT TO DEGREE MODE*

Degree mode is **NOT** the default selection of your calculator. Each time you clear the memory, the calculator will automatically revert to **Radian** mode. You must change to **Degree** mode to perform trigonometric calculations.

Press **ON**
Press **MODE**
Press \( \downarrow \) scroll down – highlight “Radian”
Press \( \rightarrow \) highlight “DEGREE”
Press **ENTER**

✓ *TRIGONOMETRIC FUNCTIONS (SIN, COS & TAN)*

The calculator must be in **Degree Mode** to complete trigonometric calculations.

Press **ON**
Press the button indicating the desired trig function
Press the button indicating the desired number(s)
Press **ENTER**

✓ *INVERSE TRIGONOMETRIC FUNCTIONS (SIN<sup>-1</sup>, COS<sup>-1</sup> & TAN<sup>-1</sup>)*

Press **ON**
Press 2<sup>nd</sup>
Press the button indicating the desired trig function
Press the button indicating the desired number(s)
Press **ENTER**

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**Graphing Functions**

✓ *GRAPHING an equation*

Press **ON**
Press **Y** =
Press the numbers needed for the equation and use \((X, T, \Theta, n)\) for the variable
Press **GRAPH**
✓ **TABLE OF VALUES**

You must have at least one (1) equation inputted in the “Y=” menu.

Press 2nd
Press GRAPH (you are accessing the table function)

✓ **INTERSECTION POINT of two linear functions**

You must first have two (2) equations inputted in the “Y=” menu.

Press 2nd
Press TRACE (you are accessing the CALC menu)
Press 5 (Intersect)
Press ENTER, ENTER, ENTER

The intersection point will be displayed on the screen.

✓ **INTERSECTION POINT of two functions with multiple intersection points**

You must first have two (2) equations inputted in the “Y=” menu.

Press 2nd
Press TRACE (you are accessing the CALC menu)
Press 5 (Intersect)
***You are prompted for the first curve, second curve, and a guess.***
Press Move the blinking cursor using the arrow keys to the FIRST CURVE close to the intersection point on the graph.
Press ENTER
Press Move the blinking cursor using the arrow keys to the SECOND CURVE close to the intersection point on the graph.
Press ENTER, ENTER

The intersection point will be displayed on the screen.
You can find only one intersection point at a time.
If multiple intersection points are present, repeat the process for each intersection point you need.
Make sure the cursor is close to the point you desire.

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**Quadratic Functions**

✓ **MAXIMUM POINT of a quadratic function**

You must first have an equation of degree 2 (an $x^2$ term) inputted in the “Y=” menu. The coefficient of the $x^2$ term must be negative to have a maximum point.

Press 2nd
Press TRACE (you are accessing the CALC menu)
Press 4 (Maximum)
***You are prompted for a left bound, right bound, and a guess.***

Press  Move the blinking cursor using the arrow keys to the LEFT side of the vertex.
Press ENTER
Press  Move the blinking cursor using the arrow keys to the RIGHT side of the vertex.
Press ENTER, ENTER

The maximum point of the function will be displayed on the screen.

✓ **MINIMUM POINT of a quadratic function**

You must first have an equation of degree 2 (an \( x^2 \) term) inputted in the “\( Y = \)” menu. The coefficient of the \( x^2 \) term must be positive to have a minimum point.

Press  2nd
Press TRACE (you are accessing the CALC menu)
Press  3 (Minimum)
***You are prompted for a left bound, right bound, and a guess.***
Press  Move the blinking cursor using the arrow keys to the LEFT side of the vertex.
Press ENTER
Press  Move the blinking cursor using the arrow keys to the RIGHT side of the vertex.
Press ENTER, ENTER

The minimum point of the function will be displayed on the screen.

✓ **ROOT(S) of a quadratic function (also called finding the zero value)**

You must first have an equation inputted in the “\( Y = \)” menu.

Press  2nd
Press TRACE (you are accessing the CALC menu)
Press  2 (Zero)
***You are prompted for a left bound, right bound, and a guess.***
Press  Move the blinking cursor using the arrow keys to the LEFT side of the zero or root. The root is the intersection of the function with the x-axis. You can find only one root at a time.
Press ENTER

Press  Move the blinking cursor using the arrow keys to the RIGHT side of the zero or root.
Press ENTER, ENTER

The coordinate of the root or zero of the function will be displayed on the screen. You can use this function on the calculator to find the coordinate(s) of the root(s) (or zero) of linear, quadratic, cubic, or any function that intersects the x-axis.
Statistics

✓ Entrying DATA into LIST(S) – L1, L2, L3, etc.

Press ON
Press STAT
Press ENTER
Press the value to be entered in the first list – L1
Press ENTER

Repeat until all the values have been entered. Make sure to press ENTER after the last value to be entered.

✓ LINE OF BEST FIT – LinReg(ax + b) ... use with SCATTERPLOTS

You must enter data into two (2) lists – L1 & L2 before you can find a line of best fit. There must be the same number of entries in each list. If there are 10 numbers in L1 then there must be 10 numbers in L2.

Press STAT
Press  → highlight “CALC”
Press 4 (LinReg(ax + b))
Press ENTER

The screen will display $y = ax + b$, where $a$ is the slope of the equation and $b$ is the $y$-intercept.

✓ MEAN of a data set

You must enter data into a list – L1 before you can perform statistics.

Press STAT
Press  → highlight “CALC”
Press 1 (1-Var Stats)
Press ENTER

The screen will display $\bar{x}$, the mean of the data set.

✓ MEAN of a data set using a list different than L1

You must enter data into a list (L1) before you can perform statistics.

Press STAT
Press  → highlight “CALC”
Press 1 (1-Var Stats)
Arrow down to highlight Calculate
Press ENTER

The screen will display $\bar{x}$, the mean of the data set.
✓ **5 NUMBER SUMMARY of a data set – MIN, Q1, MED, Q3, MAX**

You must enter data into a list – L1 before you can perform statistics.

Press STAT
Press \(\Rightarrow\) highlight “CALC”
Press 1 (1-Var Stats)
Arrow down to highlight Calculate
Press ENTER
Press \(\downarrow\) scroll down to see the 5 Number Summary

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**Probability**

✓ **FACTORIAL**

Press ON
Press the number
Press MATH
Press \(\Rightarrow\) three times to highlight “PRB”
Press 4 (!)
Press ENTER

✓ **PERMUTATIONS**

Press ON
Press the value of \(n\); that is the total number of items possible
Press MATH
Press \(\Rightarrow\) three times to highlight “PRB”
Press 2 \((n_p_r)\)
Press the value of \(r\); that is the number of items to be chosen
Press ENTER

✓ **COMBINATIONS**

Press ON
Press the value of \(n\); that is the total number of items possible
Press MATH
Press \(\Rightarrow\) three times to highlight “PRB”
Press 3 \((n_c_r)\)
Press the value of \(r\); that is the number of items to be chosen
Press ENTER