Day 2: CALCULATOR SKILLS

RADICALS: $\boxed{\text{Math}}$ #5 Example: $\sqrt[4]{16}$ is done using $4\sqrt[x]{\ }16$

EX) Evaluate the following radicals using your calculator:

1) $\sqrt[3]{173} \approx$ 5.57

2) $\sqrt[7]{254} \approx$ 2.21

REPEATING DECIMAL: Repeat the decimal to the last space on the screen then press $\boxed{\text{Math}}$ #1

3) Change the repeating decimal into a fraction using your calculator: $4.\overline{324}$

$\frac{160}{37}$

STORE: Type number into STO> x Now your calculator thinks x is that number (on the home screen only)

(Note: When you find an intersection point on a graph, the x value of the intersection is stored for the x value on the home screen.)

EX) Store 7.432 for x in your calculator. Use the function $f(x)=0.32x^2-4.23x+7.1$ to evaluate the function:

4) f(7.432) = −6.66

5) $\frac{f(7.432)-f(0)}{7.432-0}$ = $\frac{-6.66-7.1}{7.432}$ $= -1.85$

TABLE: Enter equation into y_1 = $\boxed{\ }$

$\boxed{2^{nd}}$ $\boxed{\text{WINDOW}}$ TblStart = the x value where you want the table to begin

ΔTbl = increments (for example, you may want the x values to be 5, 10, 15, etc. so the increments would be 5)

$\boxed{2^{nd}}$ $\boxed{\text{Graph}}$ The table of values will be given.

6) Complete the table of values for the function $f(x)=0.32x^2-4.23x+7.1$

x	0	0.5	1	1.5	2	2.5	3
f(x)	7.1	5.065	3.19	1.475	−.08	−1.475	-2.71

y_1(2): This is similar to the function notation f(2) except your function is named y_1 instead of f(x)

If you have the new operating system go to $\boxed{\text{Alpha}}$ $\boxed{\text{Trace}}$

If you have the old operating system:

Go to $\boxed{\text{VAR}}$ Y – VARS #1 *(select the y with the appropriate subscript)*

Parenthesis around the number. It will look the same on your screen as it does on your paper.

EX) Find the following values in the table using the y_1 feature.

7) $f(0.5) =$ 5.065 8) $f(2.5) =$ −1.475

WINDOW DIMENSIONS: [x min, x max] X [y min, y max]

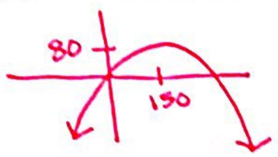
Remember that a **standard window** on your calculator is: Domain: [-10,10] Range: [-10,10]

* Sometimes a graph will not show up on your screen because the graph is outside of a standard window screen. It will take thinking, some investigation (using your table or zoom out features), and changing the dimensions of the window in order to see the entire graph. (You want to show maximums and minimums.) ***ALWAYS label some values on a graph to give the reader an idea of the size of the graph! NEVER just copy the screen of your calculator!***

EX) Sketch the <u>entire</u> graphs:

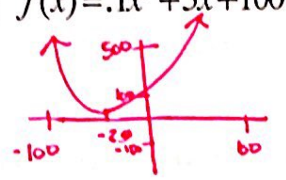
Window
x [-500, 1000]
y [-1000, 250]

9) $f(x) = -0.0032x^2 + x + 3$



Window
x [-100, 100]
y [-100, 500]

10) $f(x) = .1x^2 + 5x + 100$



"DESELECT" A FUNCTION:

Unhighlight =

ABSOLUTE VALUE FUNCTION: Math → num → # 1

REMEMBER! A calculator is a WONDERFUL TOOL and a TERRIBLE CRUTCH!!

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Day 3: GRAPHING TRANSFORMATIONS

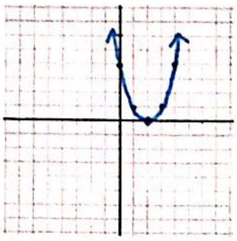
When deciding what type of transformation a number creates on a graph look for two things:

- Where is the number? (Inside or outside)
- What operation is being used? (Addition or Multiplication)

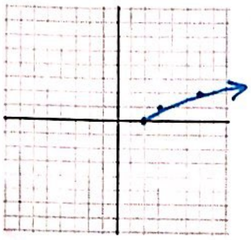
Left & Right Shifts: $f(x-c)$ *shifts right*, $f(x+c)$ *shifts left* "Translation"

Examples with different functions:

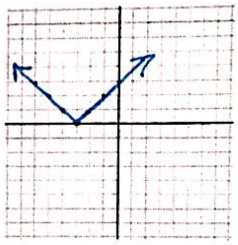
$f(x) = (x-2)^2$ → 2



$f(x) = \sqrt{x-2}$ → 2



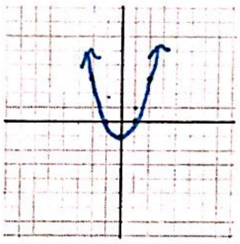
$f(x) = |x+3|$ ← 3



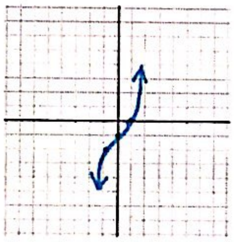
Up & Down Shifts: $f(x)+d$ *shifts up*, $f(x)-d$ *shifts down* "Translation"

Examples with different functions:

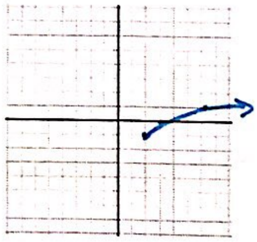
$f(x) = x^2 - 1$ ↓1



$f(x) = x^3 - 1$ ↓1



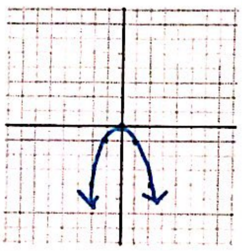
$f(x) = \sqrt{x-2} - 1$ ↓1 → 2



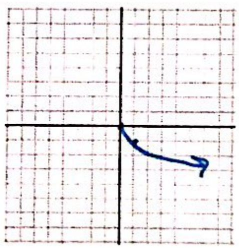
Reflections: $-f(x)$ *reflects over the x axis*, $f(-x)$ *reflects over the y axis*

Examples with different functions:

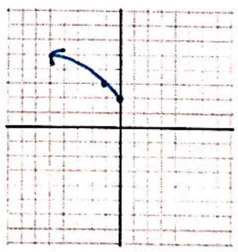
$f(x) = -x^2$ reflect over x



$f(x) = -\sqrt{x}$ reflect over x



$f(x) = \sqrt{-x} + 2$ reflect over y-axis ↑2



|a| > 1 stretch |a| < 1 Shrink

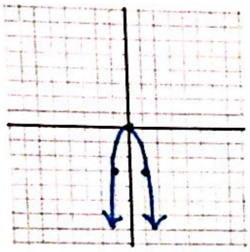
Vertical Stretch or Shrink: $af(x)$ *stretches or shrinks y values* $a*y$ "Dilation"

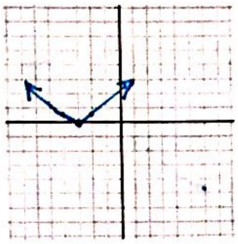
Examples with different functions:

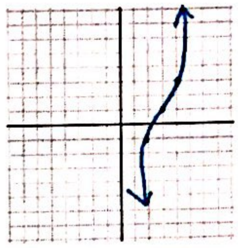
$f(x) = -3x^2$ · reflect over x · V. stretch

$f(x) = \frac{1}{2}|x+3|$ ← 3 / V. stretch

$f(x) = 2(x-3)^3 + 1$ → 3 ↑ 1 V. stretch







Horizontal Stretch or Shrink: $f(bx)$ *stretches or shrinks x values* $\frac{x}{b}$ "Dilation"

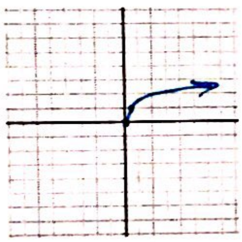
|b| > 1 stretch |b| < 1 stretch

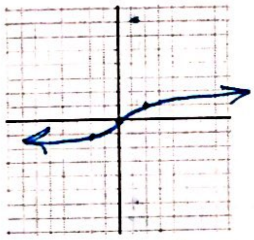
Examples with different functions:

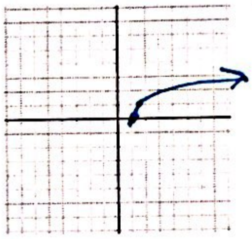
$f(x) = \sqrt{2x}$ h. Shrink

$f(x) = \sqrt[5]{\frac{x}{2}}$ h. stretch

$f(x) = \sqrt{2(x-1)}$ → 1 / h. shrink





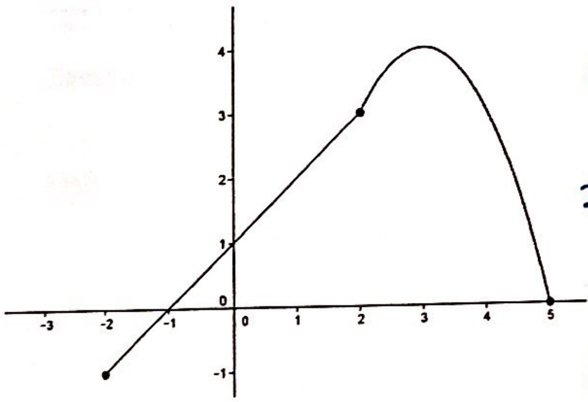


Absolute Value: $|f(x)|$ *makes all y's positive,* → |y|

→ reflect this so y's are "+".

$f(|x|)$ *erases left side of y axis and copies right side over* → makes −x's have same y-values as "+" x's.

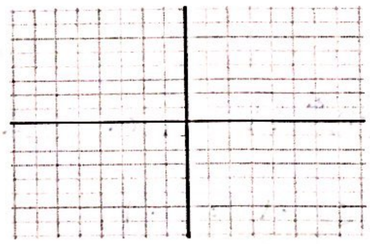
Given the graph of g(x), graph the following:



$g(|x|) - 3$

1). Cuts off left & reflect right

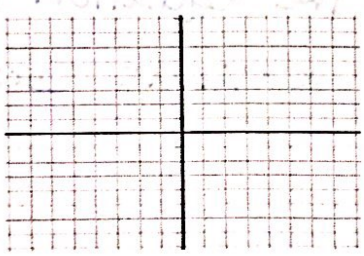
2). ↓ 3



$|g(x+1)|$

1). ← 1

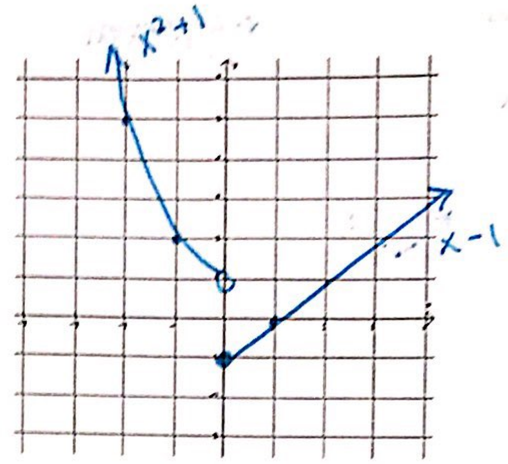
2). make all y's "+"



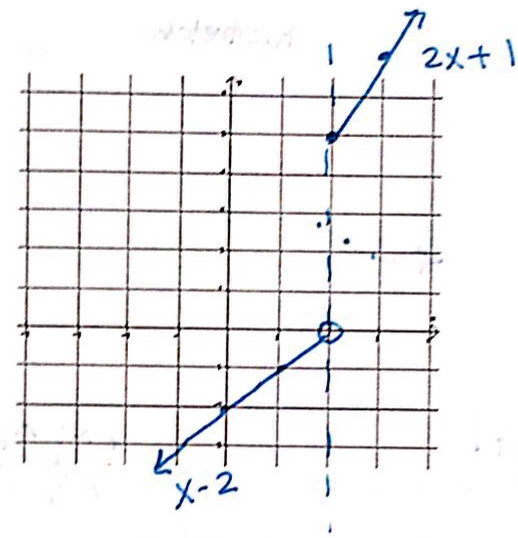
PIECEWISE FUNCTION: *A piecewise function is defined by two or more equations over a certain domain.*

EX) Graph each piecewise function:

1) $f(x)=\begin{cases} x^2+1, & x<0 \\ x-1, & x\geq 0 \end{cases}$



2) $h(x)=\begin{cases} 2x+1, & x\geq 2 \\ x-2, & x<2 \end{cases}$



3) Evaluate the function, $f(x)$, for: $f(-1)=$ $f(0)=$

$f(-1) = (-1)^2+1 = 1+1 = 2$

$f(0) = 0-1 = -1$

* Use the equation that your x-value corresponds to :)

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