Name: _____ Date: _____

THE OH SO VERY IMPORTANT...GRAPHS OF FUNCTIONS!

Graphs are one of the most powerful ways of visualizing a function's rule because you can quickly read **outputs** given **inputs**. You can also easily see features such as **maximum and minimum** output values. Let's review some of those skills in the below Do Now:

***Do Now*:** Boiling water at 212 degrees Fahrenheit is left in a room that is at 65 degrees Fahrenheit and begins to cool. Temperature readings are taken each hour and are given in the table below. In this scenario, the temperature, T, is a function of the number of hours, h.

h (hours)	0	1	2	3	4	5	6	7	8
$T(h)$ $(^\circ F)$	212	141	104	85	76	70	68	66	65

(a) Evaluate $T(2)$ and $T(6)$.

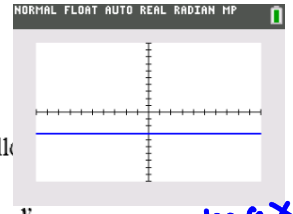
104 68

(b) For what value of h is $T(h) = 76$?

4 hours

(c) Between what two consecutive hours will $T(h) = 100$? Explain how you arrived at your answer.

Between hour 2 and 3.

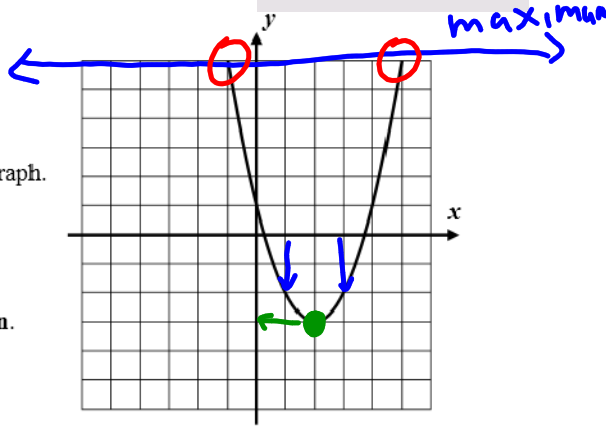


rule → GRAPH

***Exercise* #1:** Given the function $y = f(x)$ defined by the graph below, answer the foll

(a) Find the value of each of the following:

$f(4) =$ 1 $f(-1) =$ 6



(b) For what values of x does $f(x) = -2$? Illustrate on the graph.

$x = 1$ and $x = 3$

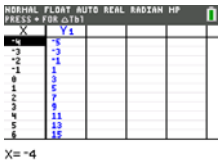
(c) State the **minimum** and **maximum values of the function**.

lowest point on the y-axis that the function touches

$y = -3$

POINT $(2, -3)$

$y = 6$



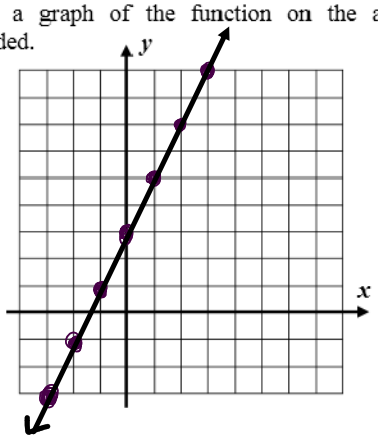
So, if we can read a graph to produce outputs (y-values) if we are given inputs (x-values), then we should be able to reverse the process and produce a graph of the function from its **algebraically expressed rule.**

***Exercise* #2:** Consider the function given by the rule $g(x) = 2x + 3$.

(a) Fill out the table below for the inputs given. (b) Draw a graph of the function on the axes provided.

(input, output)

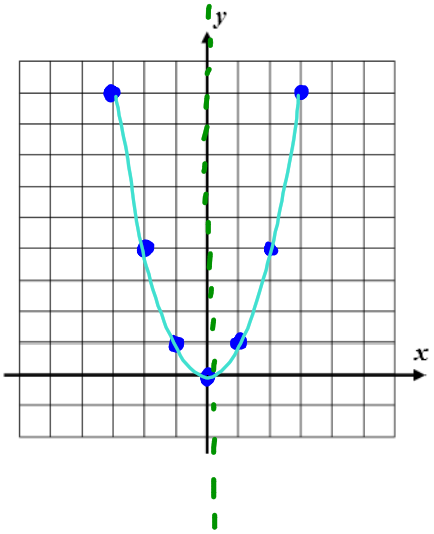
x	$2x+3$	(x, y)
−3	−3	(−3, −3)
−2	−1	(−2, −1)
−1	1	(−1, 1)
0	3	(0, 3)
1	5	(1, 5)
2	7	(2, 7)
3	9	(3, 9)



Never forget that all we need to do to **translate** between an equation and a graph is to **plot** input/output pairs according to whatever rule we are given. Let's look at a simple **non-linear** function next.

***Exercise* #3:** Consider the simplest **quadratic function** $f(x) = x^2$. Fill out the function table below for the inputs given and graph the function on the axes provided.

x	x^2	(x, y)
−3	$(-3)^2 = 9$	(−3, 9)
−2	$(-2)^2 = 4$	(−2, 4)
−1	1	(−1, 1)
0	0	(0, 0)
1	1	(1, 1)
2	4	(2, 4)
3	9	(3, 9)



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X	Y1
-4	16
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9
4	16
5	25
6	36

X= -4