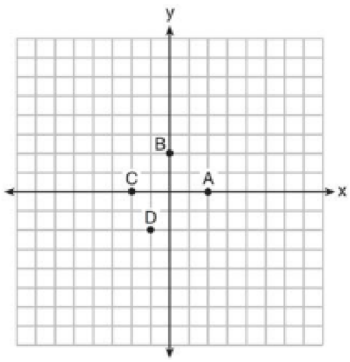
Bell Ringer:

1 The graph of $y = f(x)$ is shown below.



Which point could be used to find $f(2)$?

1) A
2) B
3) C
4) D

CC.F.IF.2: Functional Notation
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$\cancel{18}, \cancel{6}, \cancel{-3}, -12$

$\frac{2}{3}x + 3 < -2x - 7$

$\quad +7 \qquad\qquad +7$

$\frac{2}{3}x + 10 < -2x - \frac{2}{3}x$

$-\frac{2}{3}x$

$10 < -2\frac{2}{3}x$

$\frac{10}{-\frac{8}{3}} < \frac{-\frac{8}{3}x}{-\frac{8}{3}}$

$\overset{5}{\cancel{10}} \cdot \frac{-3}{\underset{4}{\cancel{8}}}$

$-\frac{15}{4}$

$-\frac{15}{4} > x$

$x < -\frac{15}{4}$

$x < -3.75$

$$7x-3(4x-8)\le 6x+12-9x$$

$$7x-12x+24\le -3x+12$$

$$-5x+24\le -3x+12$$
$$-12 \qquad\qquad -12$$

$$-5x+12\le -3x+5x$$
$$+5x$$

$$-5x+3x\le -24+12$$

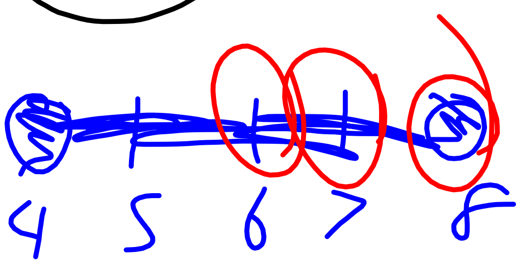
$$-2x\le -12$$
$$\overline{-2} \qquad \overline{-2}$$

$$x\ge 6$$

$$12\le 2x$$

$$6\le x \quad x\ge 6$$

$$[4,8]$$

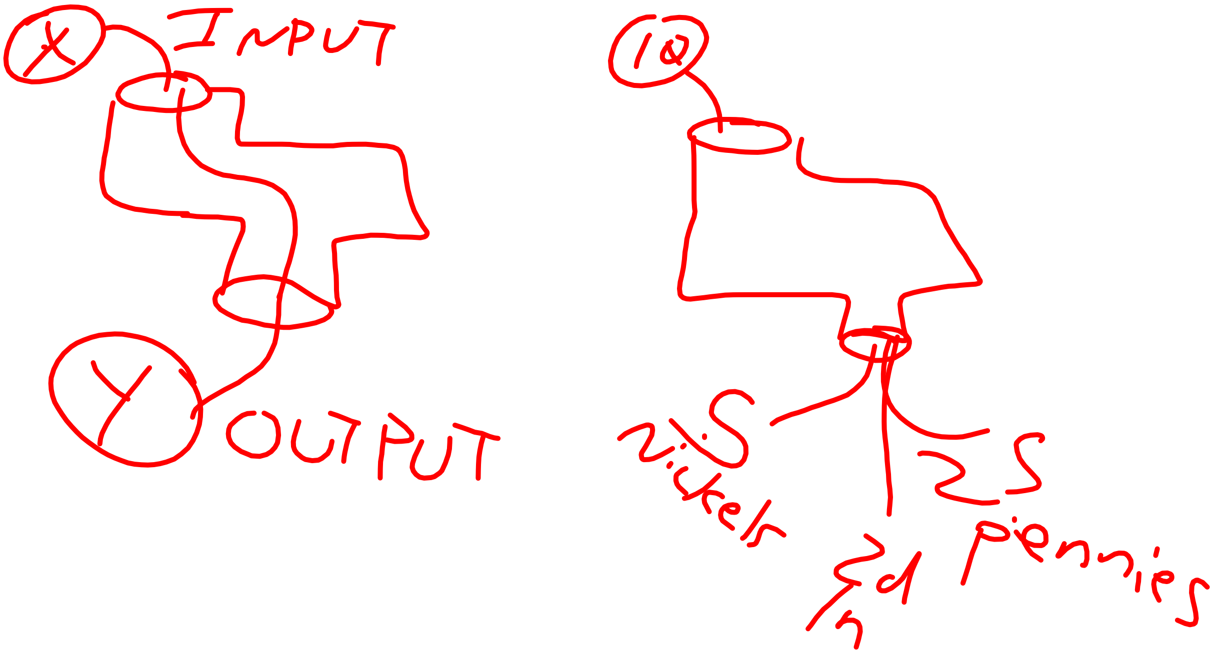


INTRODUCTION TO FUNCTIONS
COMMON CORE ALGEBRA I

The concept of the **function** ranks near the top of the list in terms of important Algebra concepts. Almost all of higher-level mathematical modeling is based on the concept. Like most important ideas in math, it is relatively simple:

THE DEFINITION OF A FUNCTION

A **function** is a clearly defined **rule** that converts an **input** into **at most one output**. These rules often come in the form of: (1) equations, (2) graphs, (3) tables, and (4) verbal descriptions.



***Exercise* #1:** Consider the function rule: multiply the input by two and then subtract one to get the output.

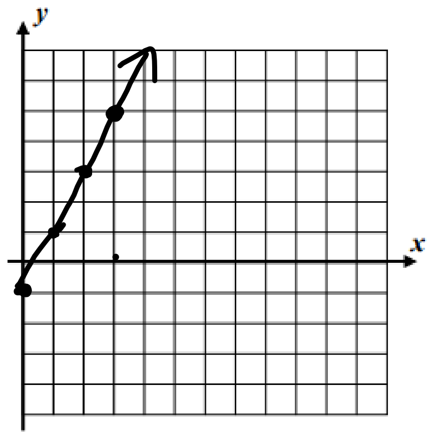
(a) Fill in the table below for inputs and outputs. Inputs are often designated by x and outputs by y.

Input x	Calculation	Output y
0	2(0)−1	−1
1	2(1)−1	1
2	2(2)−1	3
3	2(3)−1	5

(b) Write an equation that gives this rule in symbolic form.

$y = 2x - 1$

(c) Graph the function rule on the graph paper shown below. Use your table in (a) to help.



Exercise #2: In the function rule from #1, what input would be needed to produce an output of 17? Why is it harder to find an input when you have an output than finding an output when you have an input?

$f(x)=2x-1$

$1+17=2x-1+1$

$\frac{18}{2}=\frac{2x}{2}$

$x=9$

Exercise #3: A function rule takes an input, n, and converts it into an output, y, by increasing one half of the input by 10. Determine the output for this rule when the input is 50 and then write an equation for the rule.

$35=y$

$\boxed{y=\frac{1}{2}n+10}$

***Exercise* #4:** Function rules do not always have to be numerical in nature, they simply have to return a single output for a given input. The table below gives a rule that takes as an input a neighborhood child and gives as an output the month he or she was born in.

X Child	Y Birth Month
Max	January
Evin	April
Zeke	May
Rosie	February
Niko	May

(a) Why can we consider this rule a function?

1 INPUT MAPS TO ONLY 1 OUTPUT

(b) What is the output when the input is Rosie?

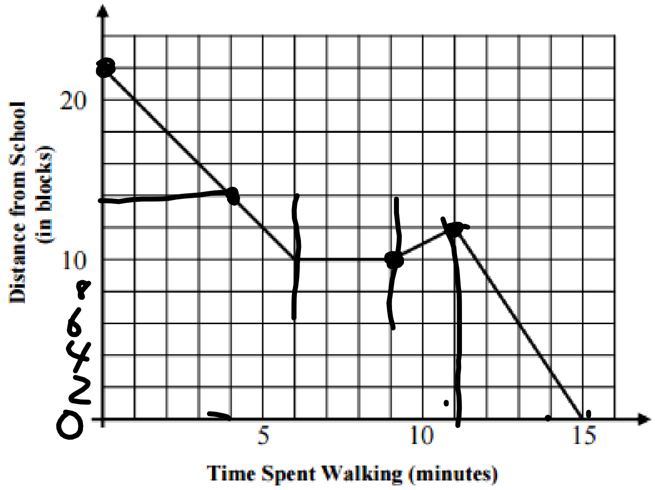
February

(c) Find all inputs that give an output of May. Why does this *not* violate the definition of a function even though there are two answers?

1 INPUT MAPS TO ONLY 1 OUTPUT, SO THE FACT THAT 2 DIFF. INPUTS MAP 2 SAME OUTPUT DOESN'T VIOLATE OUR RULES

Functions are useful because they can often be used to **model** things that are happening in the real world. The next exercises illustrates a function given only in graphical form.

***Exercise* #5:** Charlene heads out to school by foot on a fine spring day. Her distance from school, in blocks, is given as a function of the time, in minutes, she has been walking. This function is represented by the graph given below.



(a) How far does Charlene start off from school?

22 blocks

(b) What is her distance from school after she has been walking for 4 minutes?

14 blocks

(c) After walking for six minutes, Charlene stops to look for her subway pass. How long does she stop for?

3 MIN

(d) Charlene then walks to a subway station before heading to school on the subway (a local). How many blocks did she walk to the subway?

2

(e) How long did it take for her to get to school once she got on the train?

4

FLUENCY

1. Decide whether each of the following relations is a function. Explain your answer.

Input	Outputs	Function?
(a) States	Capitals	No
(b) States	Cities	
(c) Families	Pets	
(d) Families	Last names	