Algebra I
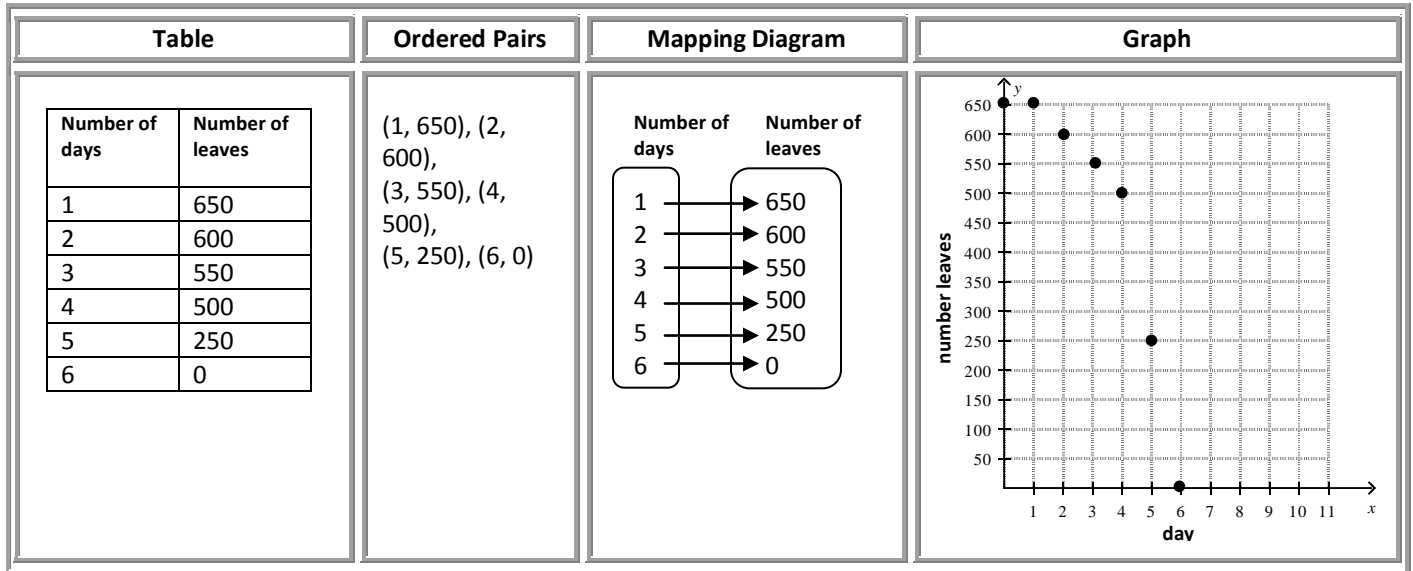## Lesson 4.2 – Relations and Functions
Mrs. Snow, Instructor

A **relation** is simply a relationship between sets of stuff. In the fall, we start to see leaves fall from the trees. Each day several leaves fall from a tree. One day the wind is very strong and blows many leaves off. Eventually there are no leaves left on the tree. Is there a relationship here? You bet! As time goes on, there are fewer and fewer leaves on the tree, then, over a shorter amount of time (when we have all the wind) the number of leaves on the tree drastically decreases. There are several ways we can display the data of time and leaf count.

Table	Ordered Pairs	Mapping Diagram	Graph

Table

Number of days	Number of leaves
1	650
2	600
3	550
4	500
5	250
6	0

Ordered Pairs

(1, 650), (2, 600),
(3, 550), (4, 500),
(5, 250), (6, 0)

Mapping Diagram

Number of days		Number of leaves
1	→	650
2	→	600
3	→	550
4	→	500
5	→	250
6	→	0

Vocabulary:

Ordered Pair – A pair of numbers (x, y) that can be used to locate a point on a graph.

Relation – a set of ordered pairs.

Domain – the set of first coordinates of an ordered pair, generally known as the **x-value**. *Written in set notation*
$$\{x \mid x = list\ numbers\}$$

Range – The set of second coordinates of the ordered pair, generally know as the **y-value.** *Written in set notation*
$$\{y \mid y = list\ numbers\}$$

Function – a special type of relation that pairs each domain value <u>*with only one*</u> range value. *When you look at your domain, you will see no repeaters.*

What is our domain for our tree example?
    (Don't forget the set notation!!)
What is our range for our tree example?
Is our tree problem a function? *(Do you see repeaters in the domain set?)*

Another cool way to determine if a graph is a function is by using the **vertical line test.** Using a ruler for a straight edge, does a vertical line cross the graph of a relation once or more than once?
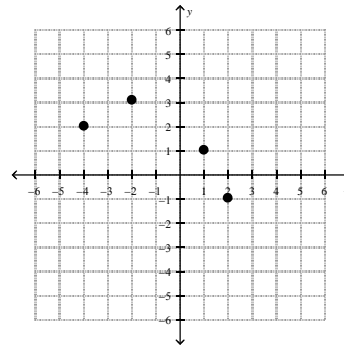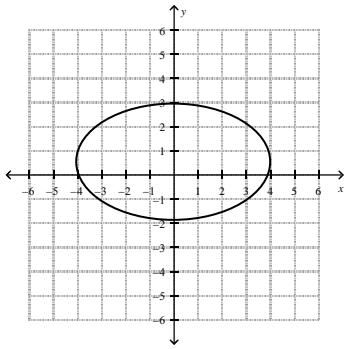
        *Pass the test – crosses the graph only once.   *Fail the test – crosses the graph more than once.
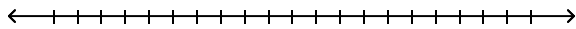
State the domain and range of each relation. Is the relation a function?

x	y
8	3
12	8
6	10
4	8

Mapping diagram:

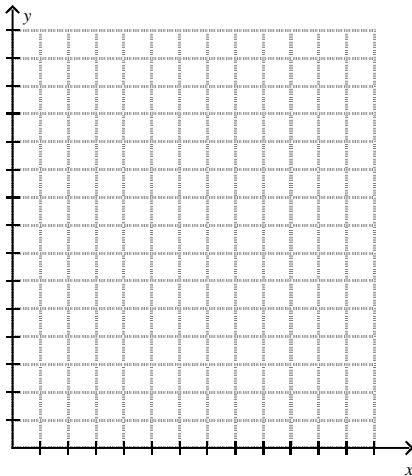| 34	
68	-1
24	0
29	3
51	5
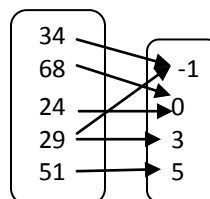
| Mr. Rogers wants to drive at least 130 miles today. So far he has driven 40. Write, solve, and graph an inequality to determine how many more miles Mr. Rogers must drive in order to make his goal.	Evaluate: $\left(\dfrac{2}{3}\right)^3$

Bagels and More bagel shop sells bagels for the following prices. Graph the data. Is this a discrete or a continuous function?	Generate ordered pairs for $y = |x + 2|$. Graph the ordered pairs and describe the pattern.

# bagels	1	2	3	4	6	12
Price $	.57	1.10	1.65	2.20	3.25	6.75
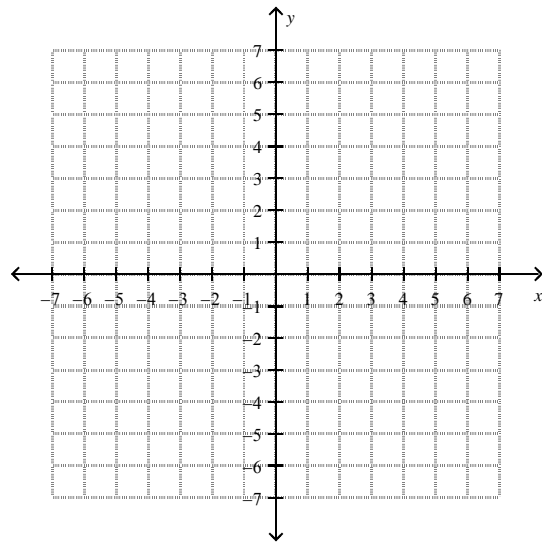
Evaluate: 4^3	Write and solve an equation to represent the relationship: Eight less than a number is equal to 4.