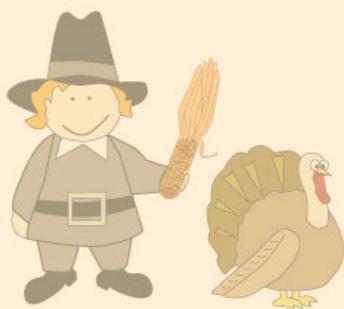


Algebra I

Lesson 4-3

- I can represent relations as sets of ordered pairs, table, mappings, & graphs.
- I can find the inverse of a relation.



A relation is a set of ordered pairs that can also be represented by a table, a graph, or a mapping.

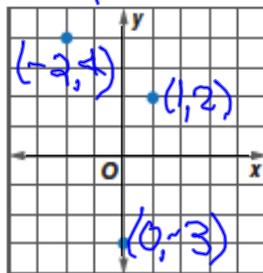
ordered pairs

(1, 2)
(-2, 4)
(0, -3)

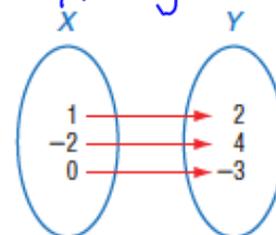
table

x	y
1	2
-2	4
0	-3

graph



mapping

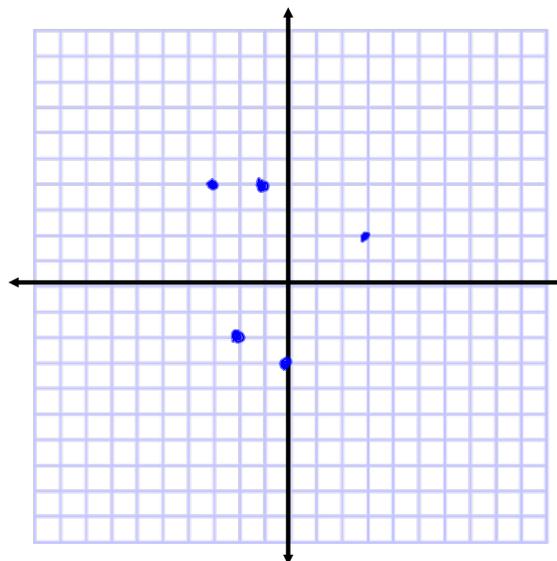


Express the relation $\{(3, 2), (-1, 4), (0, -3), (-3, 4), (-2, -2)\}$ as a table, a graph, and a mapping.

Table

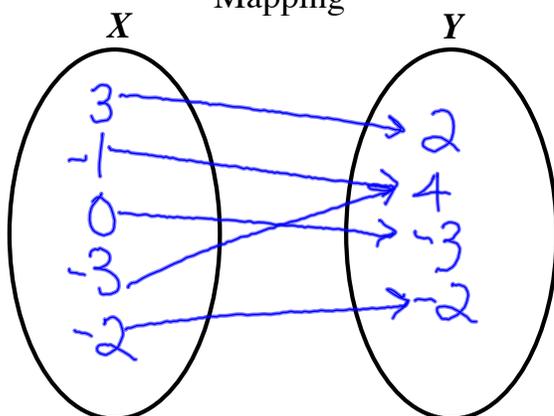
x	y
3	2
-1	4
0	-3
-3	4
-2	-2

Graph



$\{(3, 2), (-1, 4), (0, -3), (-3, 4), (-2, -2)\}$

Mapping



For this relation....

The domain is:

$\{-3, -2, -1, 0, 3\}$

The range is:

$\{-3, -2, 2, 4\}$

BALD EAGLES In 1990, New York purchased 12,000 acres for the protection of bald eagles. The table shows the number of eagles observed in New York during the annual mid-winter bald eagle survey from 1993 to 2000.

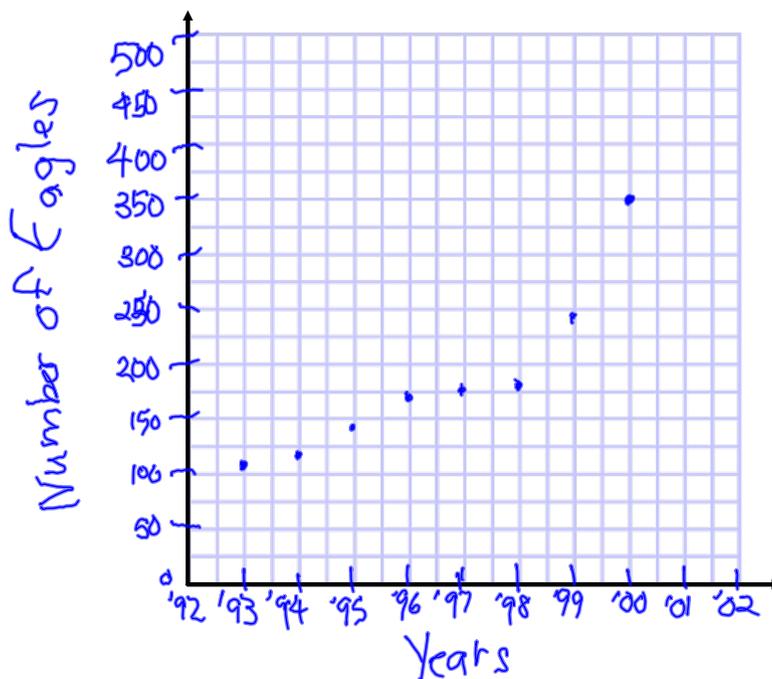
Bald Eagle Survey								
Year	1993	1994	1995	1996	1997	1998	1999	2000
Number of Eagles	102	116	144	174	175	177	244	350

Source: New York Department of Environmental Conservation

The domain is: $\{1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000\}$

The range is:

$\{102, 116, 144, 174, 175, 177, 244, 350\}$



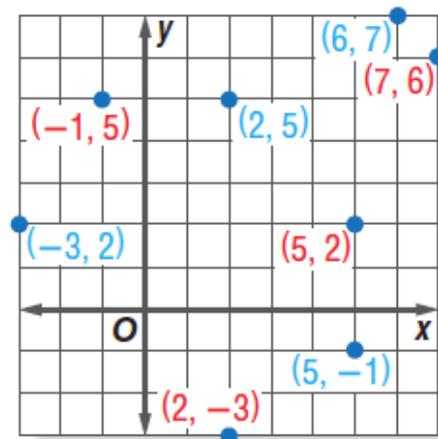
What conclusions might you make from the graph of the data?

Number of eagles is increasing possibly due to the efforts to protect them

The inverse of any relation is obtained by switching the coordinates in each ordered pair.

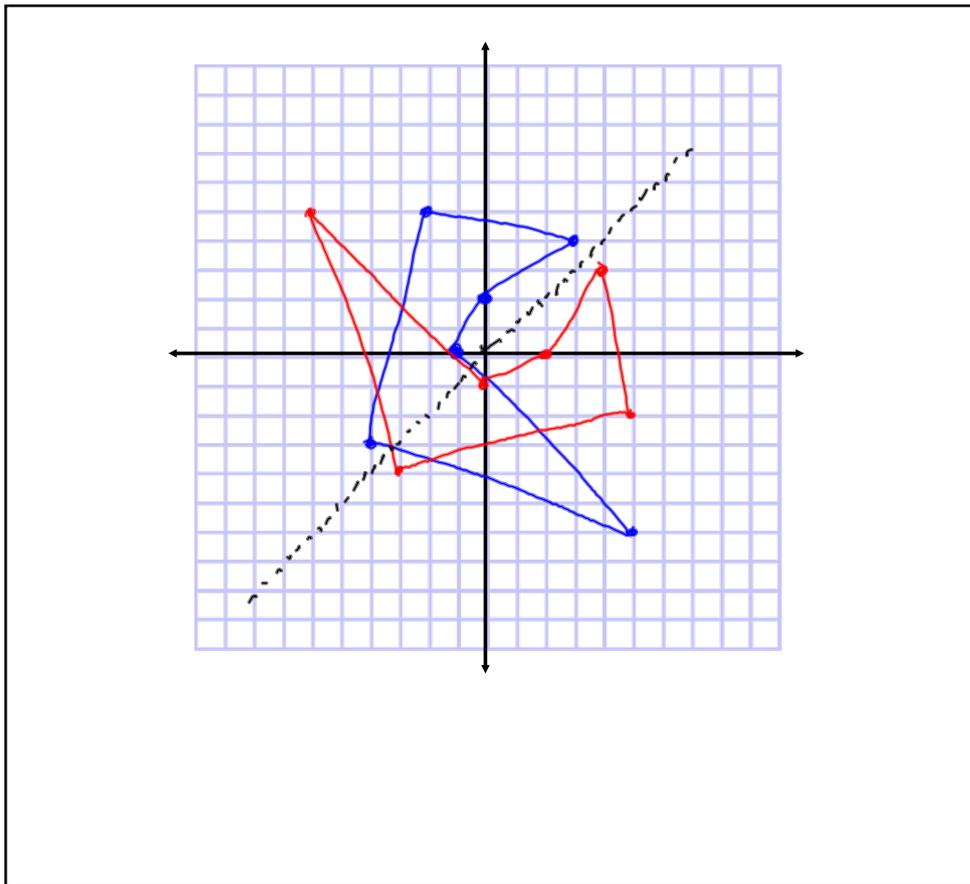
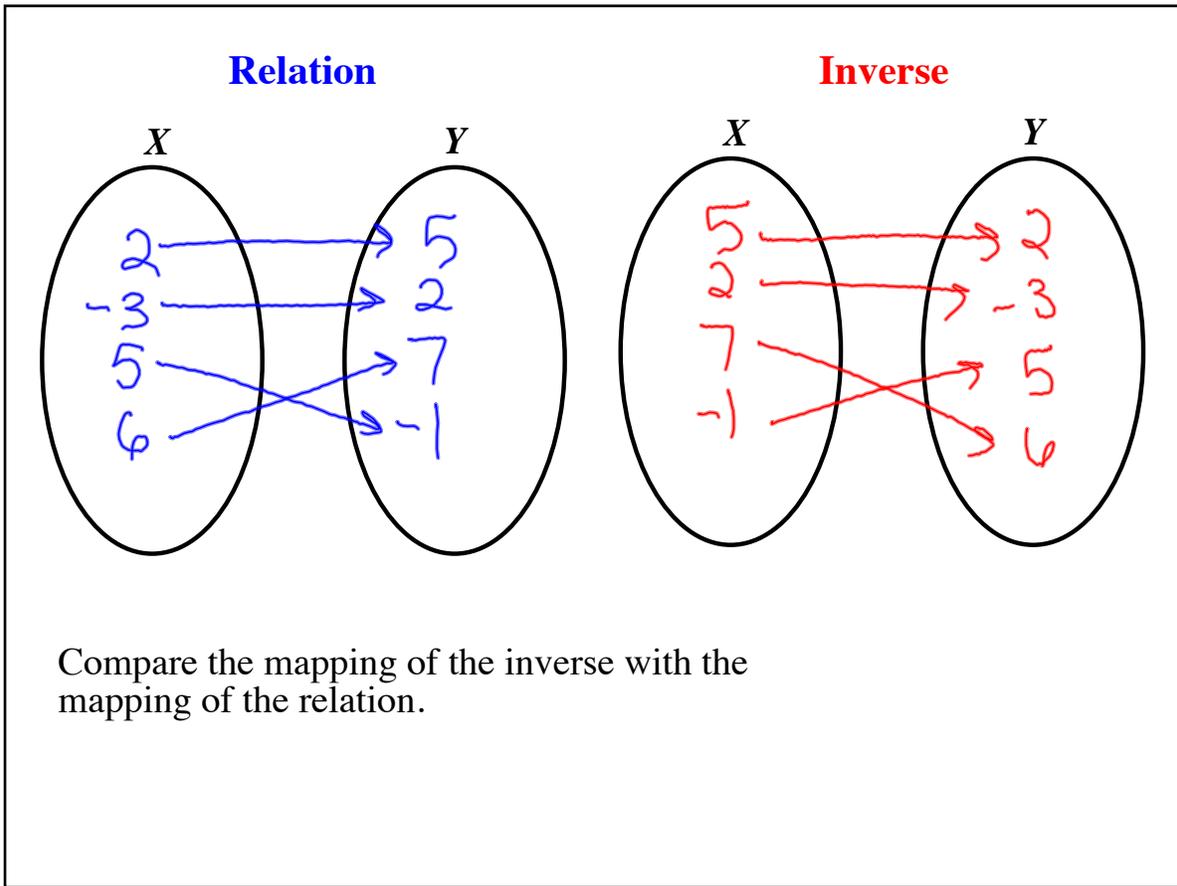
Relation Q is the inverse of relation S if and only if for every ordered pair (a, b) in S , there is an ordered pair (b, a) in Q .

Relation	Inverse
$(2, 5)$	$(5, 2)$
$(-3, 2)$	$(2, -3)$
$(6, 7)$	$(7, 6)$
$(5, -1)$	$(-1, 5)$



What do you notice about the domains and ranges of the relation and its inverse?

domain of relation becomes range of inverse
range of relation becomes domain of inverse



Activity

- Graph the relation $\{(3, 4), (-2, 5), (-4, -3), (5, -6), (-1, 0), (0, 2)\}$ on grid paper using a colored pen or pencil and connect the points in order.
- Use a different colored pen or pencil to graph the inverse of the relation, connecting the points in order.
- Fold the grid paper through the origin so that the positive y -axis lies on top of the positive x -axis. Hold the paper up to a light so that you can see all of the points you graphed.

Analysis

What do you notice about the location of the points you graphed when you looked at the folded paper?

Unfold the paper. Describe the transformation of each point and its inverse.

What do you think are the ordered pairs that represent the points on the fold line? Describe these in terms of x and y .

Make a Conjecture

How could you graph the inverse of a function without writing ordered pairs first?



Assignment:

Pgs. 209-210 #18-36 even, 44-48 all