

Lesson 4-3

Example 1 Represent a Relation

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

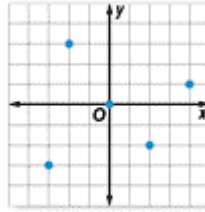
Table

List the set of x -coordinates in the first column and the corresponding y -coordinates in the second column.

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

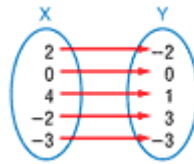
Graph

Graph each ordered pair on a coordinate plane.



Mapping

List the x -values in set X and the y -values in set Y . Draw an arrow from each x -value in X to the corresponding y -value in Y .



Example 2 Use a Relation

The table below shows the number of U.S. commercial airline departures (in millions) for the years between 1990 and 2000.

U.S. Commercial Airline Departures (in millions)											
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number of Departures	6.9	6.8	7.1	7.2	7.5	8.1	8.2	8.2	8.3	8.6	9.0

Source: *The World Almanac*

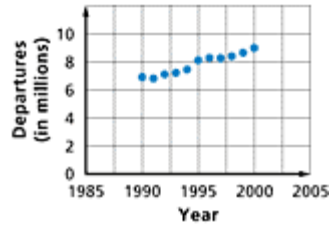
a. Determine the domain and range of the relation.

The domain is $\{1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000\}$.

The range is $\{6.8, 6.9, 7.1, 7.2, 7.5, 8.1, 8.2, 8.3, 8.6, 9.0\}$.

b. Graph the data.

- The values of the x -axis need to go from 1990 to 2000. It is not practical to begin the scale at 0. Begin at 1985 and extend to 2005 to include all of the data. The units can be 5 units per grid square.
- The values on the y -axis need to go from 6.8 to 9.0. Begin at 0 and extend to 10. You can use units of 2.



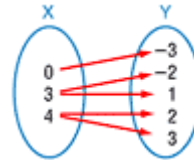
c. What conclusion might you make from the graph of the data?

The number of departures of U.S. commercial airlines has increased each year. This may be due to safer conditions or less expensive airline tickets.

Example 3 Inverse Relation

Express the relation shown in the mapping as a set of ordered pairs. Then write the inverse of the relation.

Relation: Notice that both -2 and 1 in the range are paired with 3 in the domain and both 2 and 3 in the range are paired with 4 in the domain.
 $\{(0, -3), (3, -2), (3, 1), (4, 2), (4, 3)\}$



Inverse: Exchange x and y in each ordered pair to write the inverse relation.
 $\{(-3, 0), (-2, 3), (1, 3), (2, 4), (3, 4)\}$

The mapping of the inverse is shown at the right. Compare this mapping to the mapping of the relation.

