NAME _____ DATE _____ PERIOD _____

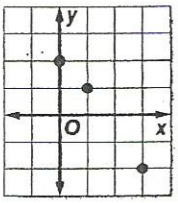
3-1 Study Guide and Intervention

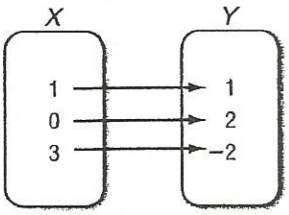
Representing Relations

Represent Relations A **relation** is a set of ordered pairs. A relation can be represented by a set of ordered pairs, a table, a graph, or a **mapping**. A mapping illustrates how each element of the domain is paired with an element in the range.

Example 1 **Express the relation {(1, 1), (0, 2), (3, −2)} as a table, a graph, and a mapping. State the domain and range of the relation.**

x	y
1	1
0	2
3	−2





The domain for this relation is {0, 1, 3}.
The range for this relation is {−2, 1, 2}.

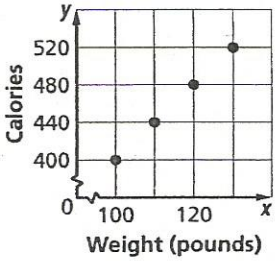
Example 2 **A person playing racquetball uses 4 calories per hour for every pound he or she weighs.**

a. Make a table to show the relation between weight and calories burned in one hour for people weighing 100, 110, 120, and 130 pounds.
Source: *The Math Teacher's Book of Lists*

x	y
100	400
110	440
120	480
130	520

b. Give the domain and range.
domain: {100, 110, 120, 130}
range: {400, 440, 480, 520}

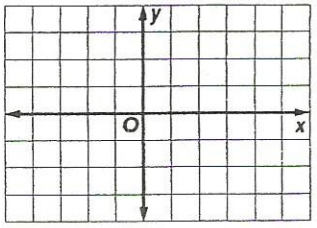
c. Graph the relation.



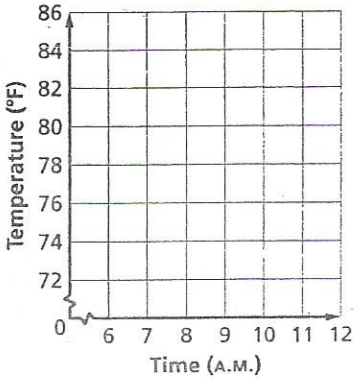
Exercises

1. Express the relation {(−2, −1), (3, 3), (4, 3)} as a table, a graph, and a mapping. Then determine the domain and range.

x	y



2. The temperature in a house drops 2° for every hour the air conditioner is on between the hours of 6 A.M. and 11 A.M. Make a graph to show the relationship between time and temperature if the temperature at 6 A.M. was 82°F.



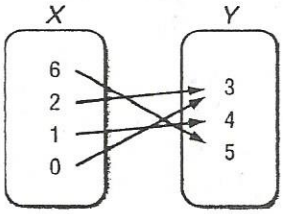
NAME _____ DATE _____ PERIOD _____

3-1 Study Guide and Intervention *(continued)*

Representing Relations

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

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



Relation: {(6, 5), (2, 3), (1, 4), (0, 3)}
Inverse: {(5, 6), (3, 2), (4, 1), (3, 0)}

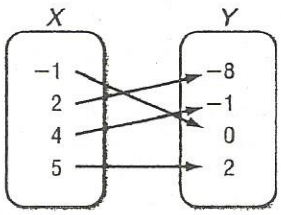
Exercises

Express the relation shown in each table, mapping, or graph as a set of ordered pairs. Then write the inverse of each relation.

1.

x	y
−2	4
−1	3
2	1
4	5

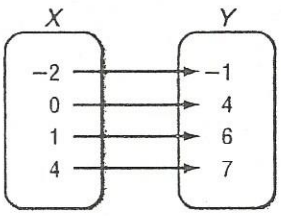
2.



3.

x	y
−3	5
−2	−1
1	0
2	4

4.



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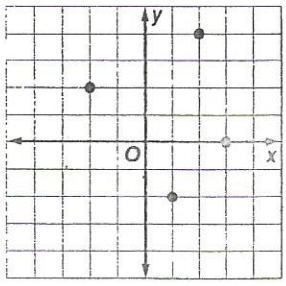

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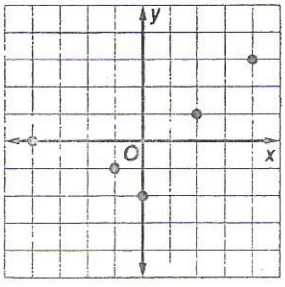


NAME _____ DATE _____ PERIOD _____

3-2 Study Guide and Intervention

Representing Functions

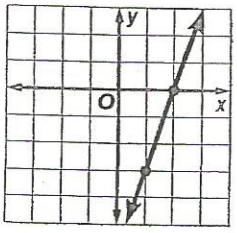
Identify Functions Relations in which each element of the domain is paired with exactly one element of the range are called **functions**.

Example 1 Determine whether the relation {(6, −3), (4, 1), (7, −2), (−3, 1)} is a function. Explain.

Since each element of the domain is paired with exactly one element of the range, this relation is a function.

Example 2 Determine whether $3x - y = 6$ is a function.

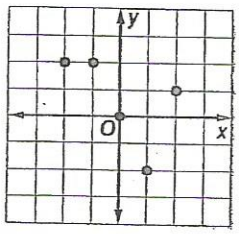
Since the equation is in the form $Ax + By = C$, the graph of the equation will be a line, as shown at the right.

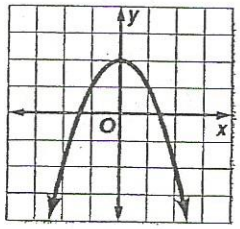


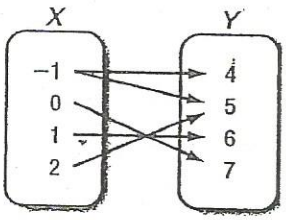
If you draw a vertical line through each value of x, the vertical line passes through just one point of the graph. Thus, the line represents a function.

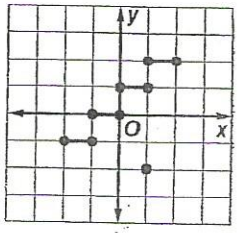
Exercises

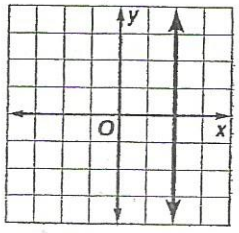
Determine whether each relation is a function.

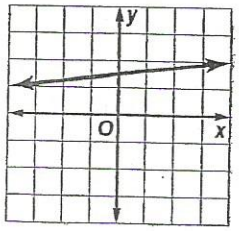
1. 

2. 

3. 

4. 

5. 

6. 

7. {(4, 2), (2, 3), (6, 1)}

8. {(−3, −3), (−3, 4), (−2, 4)}

9. {(−1, 0), (1, 0)}

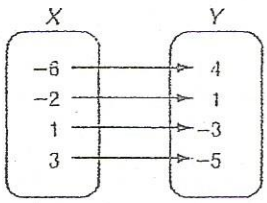
NAME _____ DATE _____ PERIOD _____

3-2 Skills Practice

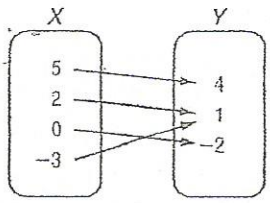
Representing Functions

Determine whether each relation is a function.

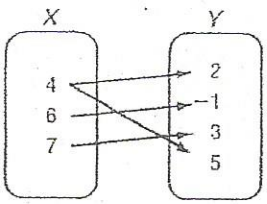
1.



2.



3.



4.

x	y
4	−5
−1	−10
0	−9
1	−7
9	1

5.

x	y
2	7
5	−3
3	5
−4	−2
5	2

6.

x	y
3	7
1	1
1	0
3	5
7	3

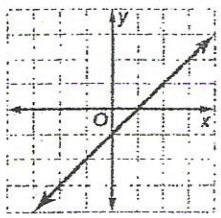
7. {(2, 5), (4, −2), (3, 3), (5, 4), (−2, 5)}

8. {(6, −1), (−4, 2), (5, 2), (4, 6), (6, 5)}

9. $y = 2x - 5$

10. $y = 11$

11.



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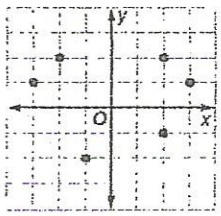

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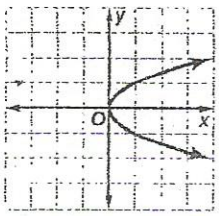
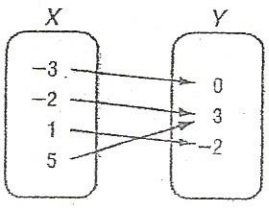


Determine whether each relation is a function.

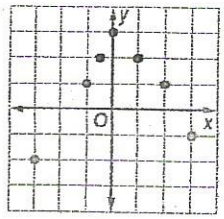
1.



2.

x	y
1	−5
−4	3
7	6
1	−2

3.



4. {(1, 4), (2, −2), (3, −6), (−6, 3), (−3, 6)}

5. {(6, −4), (2, −4), (−4, 2), (4, 6), (2, 6)}