

Warm-Up:

How do we remember order of operations?

PEMDAS

1.  $15 \div 2 + 6$   
 $30 \div 6$   
5

2.  $3(7-1) - 4$   
 $3(6) - 4$   
 $18 - 4$   
14

3.  $6 - 4 \div 2 + 5$   
 $6 - 2 + 5$   
 $4 + 5$   
9

4.  $2 - (1-3) \times 2$   
 $2 - (-2) \times 2$   
 $2 - -4$   
 $2 + 4$   
6

A relation is a relationship between two sets of data.

Every relation has a domain and a range.

Domain:

Range:

x-coordinate

y-coordinate

input

output

independent values

dependent values

A function is a special relation in which each input is mapped to only one output.

[In other words, no x's repeat.]

each x has only one y

Consider the following relation:  $\{(-1, 4), (2, 0), (-4, -7), (3, 5), (4, -1)\}$

Function? yes Domain:  $\{-1, 2, -4, 3, 4\}$  Range:  $\{-7, -1, 0, 4, 5\}$

put in order!  $\{-4, -1, 2, 3, 4\}$

Consider the following relation:  $\{(2, -3), (1, 6), (-5, -4), (2, 4), (6, 0)\}$

Function? No Domain:  $\{-5, 1, 2, 6\}$  Range:  $\{-4, -3, 0, 4, 6\}$

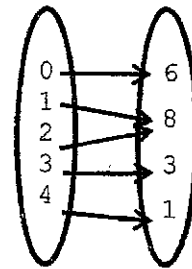
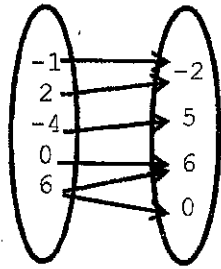
x's repeat w/ different y's

Consider the following relation:  $\{(-2, 2), (-1, 2), (0, 2), (1, 2), (2, 2)\}$

Function? yes Domain:  $\{-2, -1, 0, 1, 2\}$  Range:  $\{2\}$

Determine if the following tables and mappings are functions. Describe the domain and range.

x	y
-2	14
1	10
4	6
7	2
11	-2



x	y
2	7
-1	2
0	-5
4	3
4	-2

Function? yes

Function? No

Function? yes

Function? No

Domain:  $\{-2, 1, 4, 7, 11\}$

Domain:  $\{-4, -1, 0, 2, 6\}$

Domain:  $\{0, 1, 2, 3, 4\}$

Domain:  $\{-1, 0, 2, 4\}$

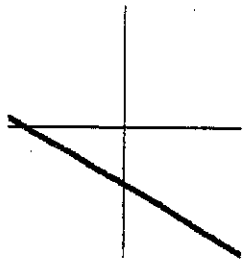
Range:  $\{-2, 2, 6, 10, 14\}$

Range:  $\{-2, 0, 5, 6\}$

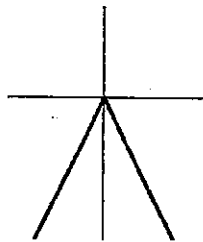
Range:  $\{1, 3, 6, 8\}$

Range:  $\{-5, -2, 2, 3, 7\}$

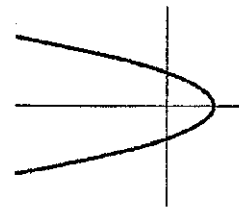
In order to determine if a graph is a function, use the vertical line test. Vertical line doesn't touch graph more than once



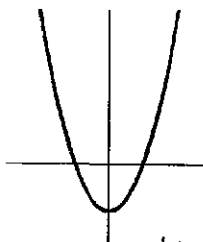
Function? yes



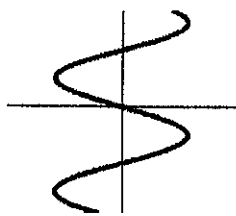
Function? yes



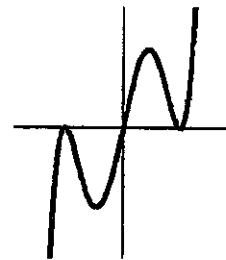
Function? No



Function? yes



Function? No



Function? yes

# Ways to Represent RELATIONS

## ORDERED PAIRS

$\{(-1, 2), (0, 5), (2, 7)\}$

Domain:  $\{-1, 0, 2\}$

Range:  $\{2, 5, 7\}$

Function? Yes!

## TABLES

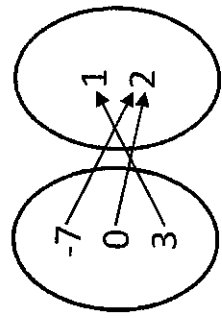
Domain Range	
x	y
3	1
-2	-4
0	2
3	6

Domain:  $\{-2, 0, 3\}$

Range:  $\{-4, 1, 2, 6\}$

Function? No, x's repeat

## MAPPINGS

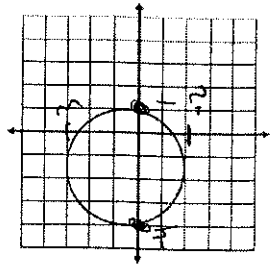


Domain:  $\{-7, 0, 3\}$

Range:  $\{1, 2\}$

Function? yes

## GRAPHS



Domain:  $[-1, 1]$

Range:  $[-1, 1]$

Function? No → fails vertical line test



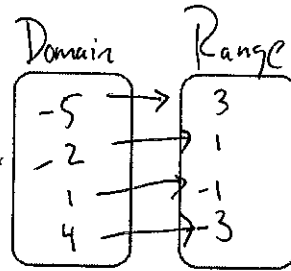
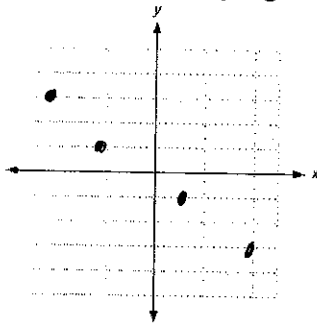
**LESSON**  
**8-2**

**Practice B**  
**Relations and Functions**

Express each relation as a table, as a graph, and as a mapping diagram.

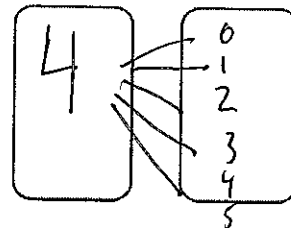
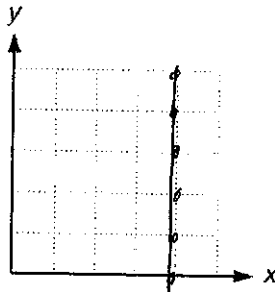
1.  $\{(-5, 3), (-2, 1), (1, -1), (4, -3)\}$

x	y
-5	3
-2	1
1	-1
4	-3

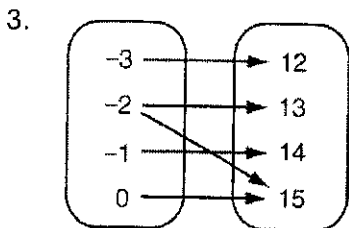


2.  $\{(4, 0), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5)\}$

x	y
4	0
4	1
4	2
4	3
4	4
4	5



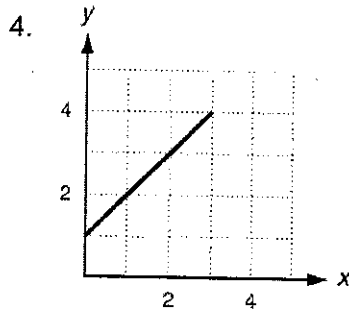
Give the domain and range of each relation. Tell whether the relation is a function. Explain.



D:  $\{-3, -2, -1, 0\}$   
R:  $\{12, 13, 14, 15\}$

Function? No

Explain: x's repeat w/ different y's



D:  $[0, 3]$  or  $\{0 \leq x \leq 3\}$   
R:  $[1, 4]$  or  $\{1 \leq y \leq 4\}$

Function? yes

Explain: passes vertical line test

5. 

x	y
8	8
6	6
4	4
2	6
0	8

D:  $\{0, 2, 4, 6, 8\}$   
R:  $\{4, 6, 8\}$

Function? yes

Explain: x's don't repeat



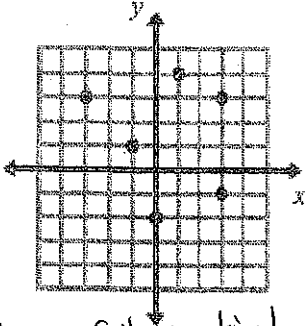
# Function Notation and Evaluating Functions Practice Worksheet B

Name \_\_\_\_\_

Class Period \_\_\_\_\_

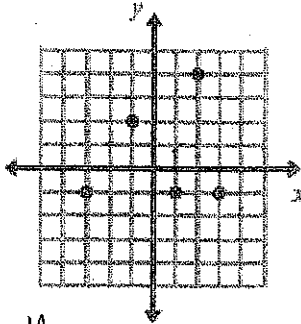
Decide whether the graph represents  $y$  as a function of  $x$ . If it is a function, give the domain and range.

1.



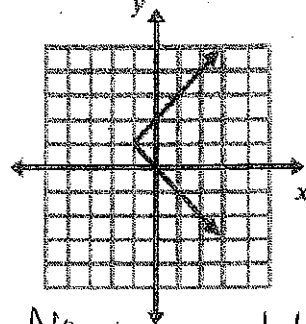
No → fails vertical line test

2.



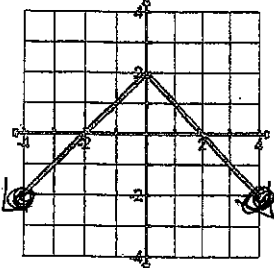
Yes  
 $D: \{-3, -1, 1, 2, 3\}$   
 $R: \{1, 2, 3, 4\}$

3.



No Fails vertical line

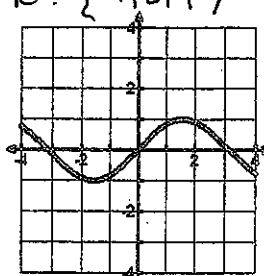
4.



Yes  $D: (-4, 4)$

$R: [-2, 2]$

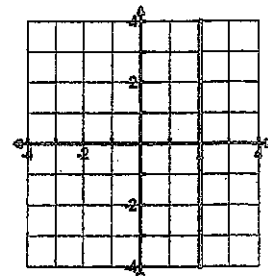
5.



Yes  $D: (-4, 4)$

$R: [-1, 1]$

6.



No fails vert. line test

Decide whether the relation is a function. If it is a function, give the domain and the range.

7.

Input	Output
1	7
1	-7
2	8
2	-8

No!

8.

Input	Output
3	2
5	4
7	6

Yes  $D: \{3, 5, 7\}$

$R: \{2, 4, 6\}$

9.

Input	Output
0	-6
2	-4
4	-2
6	0

Yes

$D: \{0, 2, 4, 6\}$

$R: \{-6, -4, -2, 0\}$