1.1 – 1.2 Domain, range, and function notation

Definitions: Function – A mathematical relation where each value of x only gives ONE (at most) values of y

Domain – All of the x values that CAN be put into a relation

Range – All of the y values that CAN be produced by a function

Vertical line test for a function:

Draw vertical lines through the graph. If any of the lines intersect the graph MORE THAN ONCE, it is NOT a function. Otherwise, it is.

Ex. Graph the relations shown in each of the following tables of values, then

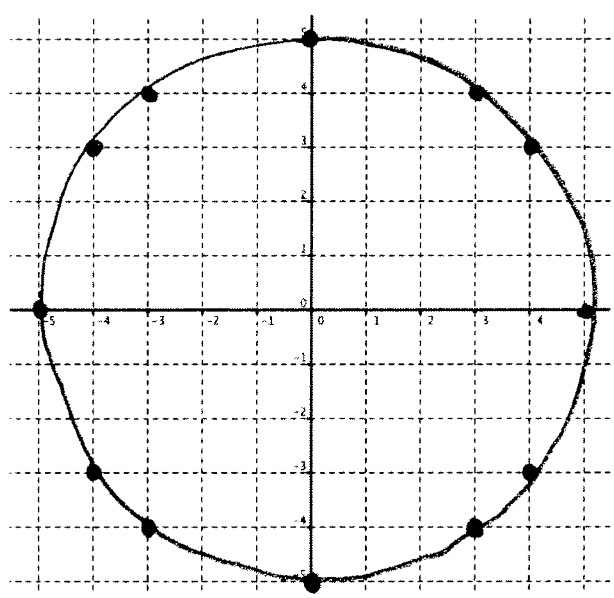
- write an equation for each relation
- label all x-intercepts and y-intercepts
- state the domain and range of each relation
- indicate which relation(s) are not functions based on their table(s) of values and graph(s)

a)

x	y
-5	0
-4	-3
-4	3
-3	-4
-3	4
0	-5
0	5
3	-4
3	4
4	-3
4	3
5	0

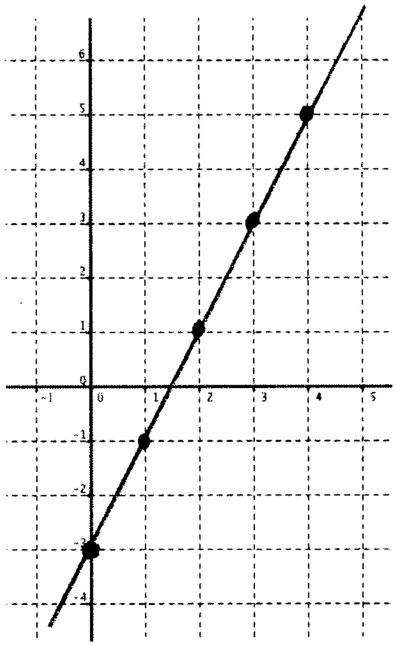
D: $\{-5 \le x \le 5\}$

R: $\{-5 \le y \le 5\}$



b)

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

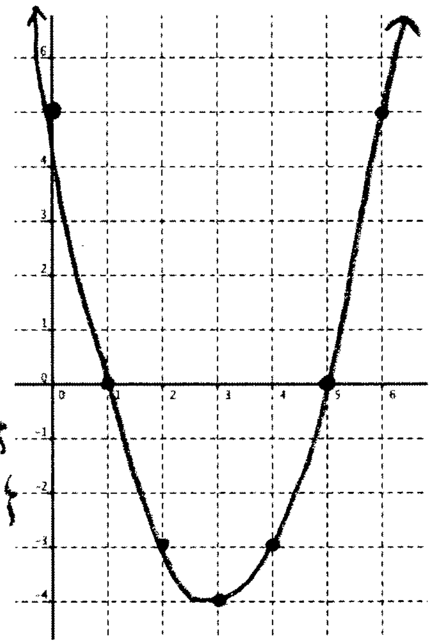


$D:\{x \in \mathbb{R}\}$

$R:\{y \in \mathbb{R}\}$

c)

x	y
0	5
1	0
2	-3
3	-4
4	-3
5	0
6	5



$D:\{x \in \mathbb{R}\}$

$R:\{y \geq -4\}$

We use <u>function notation</u> to indicate which variable is the "input" or independent variable:

This allows us to show the "y" value of a function and the "x" value that it depends on.

If $f(x) = x^2 - 9$ "a function of x is equal to x squared minus nine"

Then $f(4) =$ "the value of the function when x (the input) is four"

or "f at 4 equals" or "f of 4 equals"

Ex. Use function notation to determine "the value of each function at each x-value."

a) For $f(x) = 3x - 5$:

$f(-4) = 3(-4) - 5$
$= -12 - 5$
$= -17$

$f(0) = 3(0) - 5$
$= -5$

b) For $g(x) = 2x^2 - x - 3$:

$g(-1) = 2(-1)^2 - (-1) - 3$
$= 2 + 1 - 3$
$= 0$

$g(\frac{3}{2}) = 2(\frac{3}{2})^2 - (\frac{3}{2}) - 3$
$= 2(\frac{9}{4}) - \frac{3}{2} - 3$
$= \frac{9}{2} - \frac{3}{2} - \frac{6}{2}$
$= 0$

Homework: p. 12 # 1acd, 5ad. p. 22 # 1abcd.