## Sec 5-2: Relations and Functions

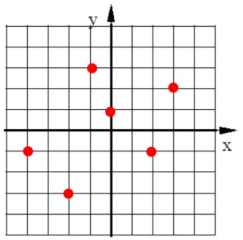
### 1. What is a Relation?

Relation: A set of ordered pairs.

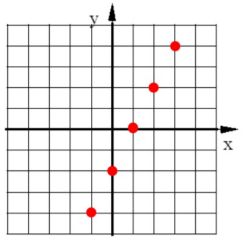
A bunch of points.

These points may or may not have a particular relationship

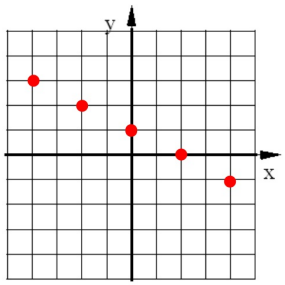
These are both Relations.



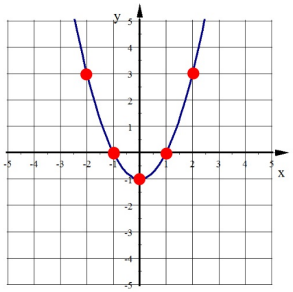

No relationship
(no correlation)




Linear Relationship
(pos correlation)




Linear Relationship
(Neg correlation)




Quadratic Relationship

### 2. What is the Domain of a Relation?

Domain: All the different x values in numerical order.

Listed in order without repeating!

### 3. What is the Range of a Relation?

Range: All the different y values in numerical order.

Listed in order without repeating!

## Other names for Domain and Range

| Domain | Range |
| --- | --- |
| • x-coordinates<br>• Input<br>• Independent Variable | • y-coordinates<br>• Output<br>• Dependent Variable |

$(4,-1),(2,3),(4,-5),(-2,6),(1,3)$

4. State the Domain and Range of this Relation:

Domain:

-2
1
2
4

Range:

-5
-1
3
6

State the domain and range of this relation.

(6,-1),(2,-5),(-1,7),(9,-4),(1,3)

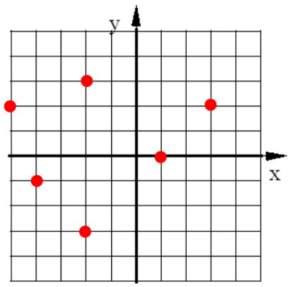
Domain:

-1, 1, 2, 6, 9

Range

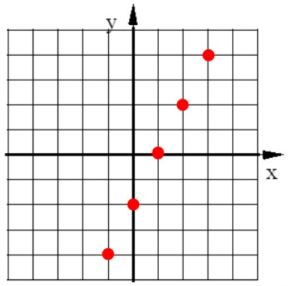
-5, -4, -1, 3, 7

State the Domain and Range or each Relation




Domain: -5, -1, -2, 1, 3

Range: -3, -2, 0, 2, 3

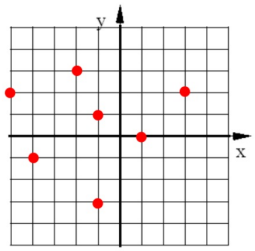



Domain: -1, 0, 1, 2, 3

Range: -4, -2, 0, 2, 4

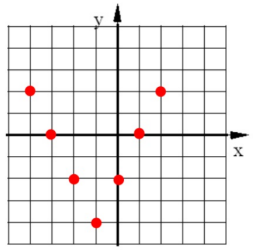
These are called Discrete Graphs.

The domain and range can just be listed using all the values of x and y.




Domain: -5, -4, -3, -1, 1, 3

Range: -3, -1, 0, 1, 2, 3



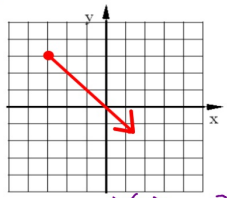

Domain: -4, -3, -2, -1, 0, 1, 2

Range: -4, -2, 0, 2

**Discrete Quantity**
a quantity that can be counted

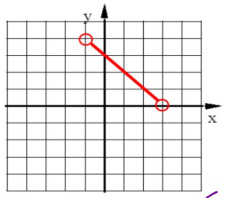
These are called Continuous Graphs.

The domain and range can't be listed using all the values of x and y because there are an infinite # of points. You must use INEQUALITIES




Domain: $x \geq -3$

Range: $y \leq 3$




Domain: $-1 < x < 3$

Range: $0 < y \leq 4$

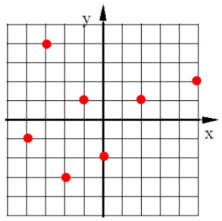
**Continuous Quantity**
Quantity that can't be counted, it has to be measured.

# 6. What is a Function?

Some Relations are called Functions.

Every x value is paired with one and only one y value.

For every input there is only one output




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

Is this relation a function?

Yes

each x-value produces only one y-value.

Real-Life Functions and Non-Functions

You look up a word in the dictionary to get a definition:

Input (domain): A word
Output (range): Definition

Is a Dictionary a Function?

NO

A word ( one input) might have more than one definition (more than one output)

A policman looks up a license plate number to find who it is registered to:

Input (domain): License plate number
Output (range): Who the car is registered to

Does this relationship represent a Function?

Yes

Each license plate number (one input) is registered to only one person (one output)