Sec 2-1:

A Relation is: A relation is a set of pairs of input and output values.

A bunch of points!

There may or may not be any special relationship amongst the points.

(9, 3)   (4, 1)   (-6, 12)   (4, 6)   (-10, 1)

State the Domain and Range of this relation

Domain: $\{-10, -6, 4, 9\}$ Range: $\{1, 3, 6, 12\}$
   X   Y

Domain is also called:

• All the different x-values

• Input

• Independent Variable

Range is also called:

• All the different y-values

• Output

• Dependent Variable

State the Domain and Range of this relation:

(-2, 4)
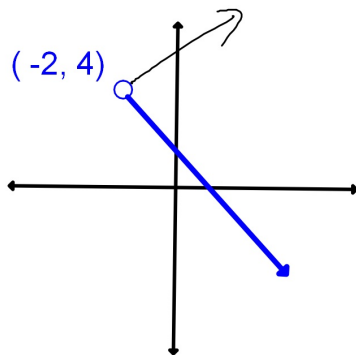
Domain: $x > -2$

Range: $y < 4$
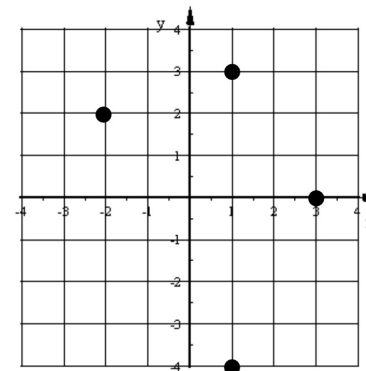
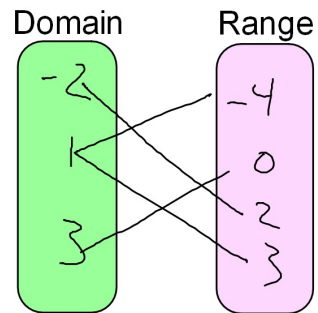State the Domain and Range of this relation:

Domain: $\{-2, 1, 3\}$

Range: $\{-4, 0, 2, 3\}$

Mapping Diagram: (-2,2) (1,-4) (1,3) (3,0)

Domain   Range

-2
1
3

-4
0
2
3

Is this relation
a Function?

NO

A Function is:
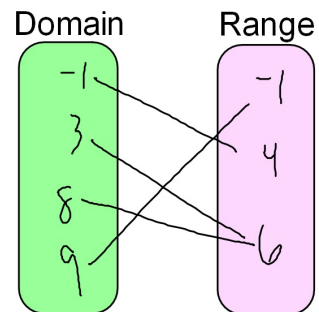
A relation that pairs one x-value with exactly
one y-value.

Each input produces ONLY ONE output.

Is this relation a function?

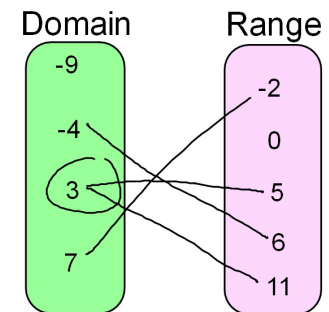| X	Y
3	6
−1	4
8	6
9	−1

YES

Domain   Range

-1
3
8
9

-1
4
6

Is this relation a function?

X	Y
3	5
7	−2
−4	6
3	11
−9	0

NO

Domain   Range

-9
-4
3
7

-2
0
5
6
11

1. Is each of the following statements true or false?
   a) All relations are functions.   b) All functions are relations.
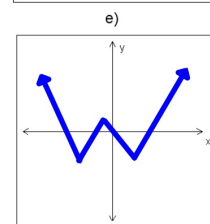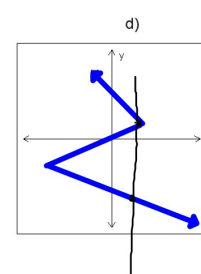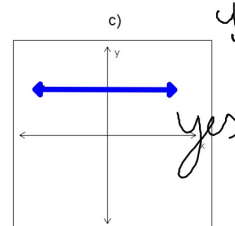
   FALSE   TRUE

2. Is each of the following relations a function?
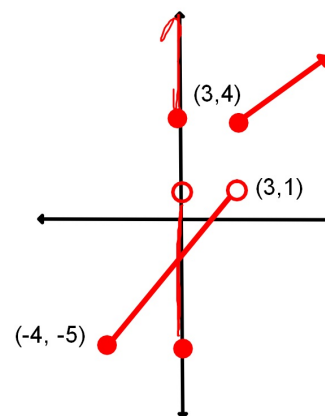   a) $(1,3),(2,3),(-4,-1),(5,5)$ b) $(-7,4),(-1,9),(9,3),(-1,6)$

   yes   NO

   c)

   yes

   d)

   NO

   e)

   Yes

Vertical-Line Test:

If any vertical line can intersect a relation in more than one spot, then the relation is NOT a function.

Find the domain and range of this graph and determine if it is a function or not.

(3,4)

(3,1)

(-4, -5)

$x \geq -4$

Domain $\left(\begin{array}{c} x \geq 3 \\ -4 \leq x < 3 \end{array} \right)$

Range

$-5 \leq y < 1, \; y \geq 4$