Pre-Algebra Notes SOL 8.16 (8-1) Functions Mrs. Grieser

Name: _____ Block: _____ Date: _____

Functions

We know: A relation is a set of ordered pairs.

A **function** is a relation in which each member of the domain is paired with exactly one (one and only one (*OAOO*)) member in the range.

Since functions are relations, they can be represented using ordered pairs, tables, or graphs.

Relation	*Diagram*	*Is the relation a function?*
{(-10, -34), (0, -22), (10, -9), (20, 3)}	Domain (x) Range (y) -10 → -34 0 → -22 10 → -9 20 → 3	Yes. Every domain value is paired with exactly one (*OAOO*) range value.
{(-10, -34), (-10, -22), (10, -9), (20, 3)}	Domain (x) Range (y) -10 → -34 -10 → -22 10 → -9 20 → 3	No, because -10 in the domain is paired with two range values, -34 and -22.

Determining if a relation is a function

If all x-values have one and only one (*OAOO*) y-value, then we have a function. If we can find an instance of a domain value (x value) that has more than one range value (y value), then we have shown a relation is *not* a function.

Examples: Function, or not a function? Explain.

a) {(-3, 1), (-2, 4), (-1, 7), (0, 10), (1, 13)}

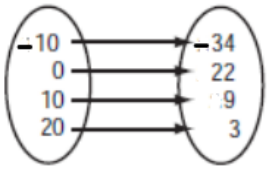
Function? (yes/no) Why?

b)

x	5	3	2	0	−4	−6
y	1	3	1	3	−2	2

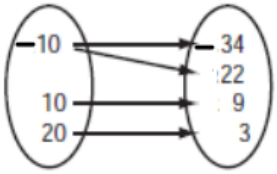
Function? (yes/no) Why?

c) Mapping Diagram:



Function? (yes/no) Why?

d) Mapping Diagram:



Function? (yes/no) Why?

** CAUTION: It does not matter in a function if a y-value appears more than once – each x-value may only appear once in the domain. **

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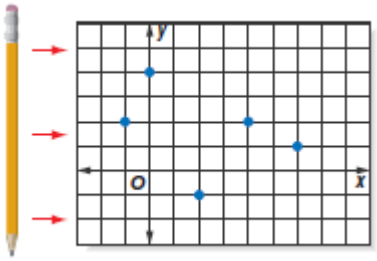
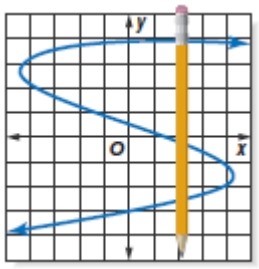
Graphs

Graphs can be analyzed to determine if a function is represented. If an x-value has more than one y-value, then it is not a function.

One way to determine this is by using the vertical line test. Place a pencil or other vertical object at the left of a graph. Move it slowly towards the right of the graph. If the pencil ever passes through more than one point, than the relation is **not** a function.



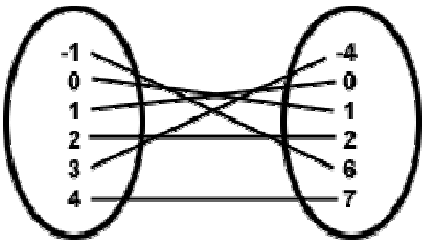
Function. Why?



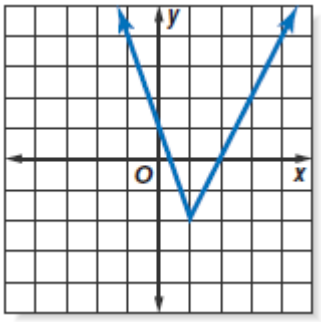
Not a function. Why not?

Are the following relations functions? Explain your answer.

a)



b)



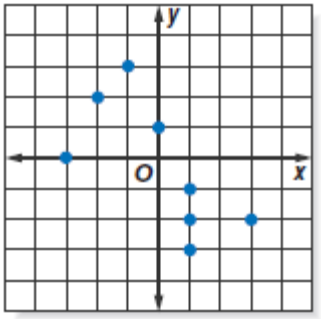
c)

Domain	Range
−3	3
−1	−2
0	5
1	−4
2	3

d)

x	y
5	4
2	8
−7	9
2	12
5	14

e)



f) {(1, 1), (2, 4), (3, 9), (-1, 1), (-2, 4), (-3, 9)}