

5-2b Relations and Functions

~~relation~~
relation -

relation a set of coordinates

Remember, a function assigns exactly one output (range) value for each input (domain) value.

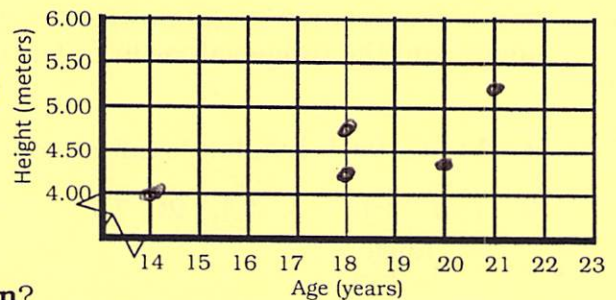
The (age, height) ordered pairs below form a relation.

Giraffes

Age (years)	18	20	21	14	18
Height (meters)	4.25	4.40	5.25	4.00	4.85

List the set of ordered pairs in this relation and plot the set of points.

$(18, 4.25)$ $(20, 4.40)$ $(21, 5.25)$
 $(14, 4.00)$ $(18, 4.85)$



How do we determine if the above **relation** is a **function**?

You can tell whether a relation is a function by analyzing the graph of the relation using the vertical line test.

If any vertical line passes through more than 1 point of the graph, then the relation is not a function.

Use the vertical line test to determine whether each relation is a function.

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

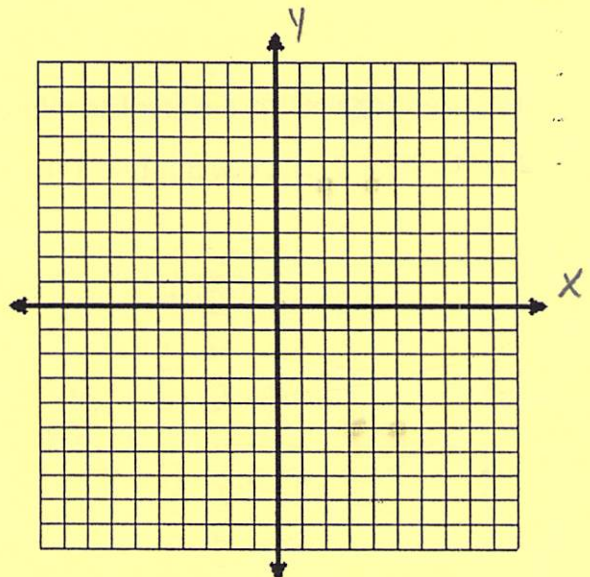
Function

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

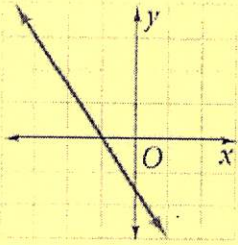
Not a Function

- $\{(-2, 9), (3, 9), (-0.5, 9), (4, 9)\}$

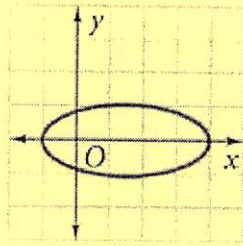
Function



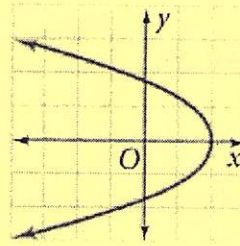
Use the vertical line test to determine whether each graph is the graph of a function.



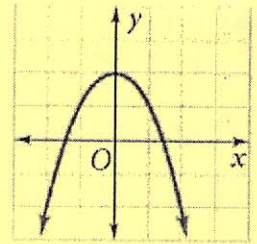
Function



Not a
Function



Not a
Function

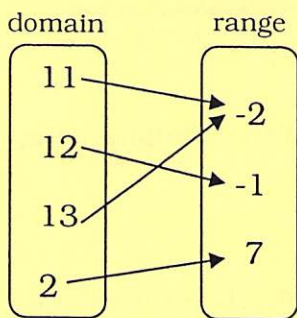


Function

Another way you can tell if a relation is a function is by making a **mapping diagram**. List the domain values and the range values in order. Draw arrows from the domain values to their range values.

Determine whether each relation is a function.

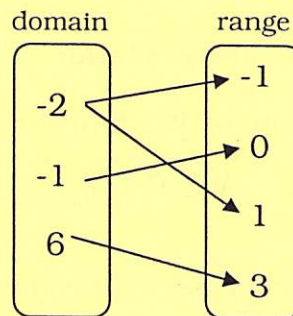
1. $\{(11, -2), (12, -1), (13, -2), (20, 7)\}$



1 arrow is
coming from
each
domain value

Yes

2. $\{(-2, -1), (-1, 0), (6, 3), (-2, 1)\}$

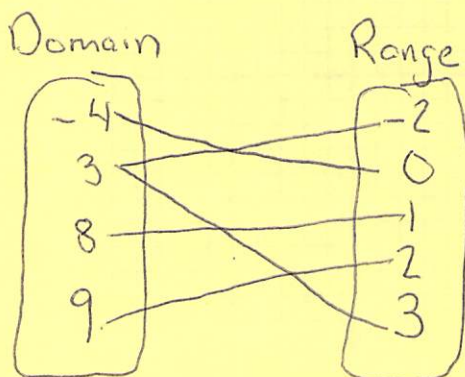


2 arrows
are coming
from
-2 in the
domain

NO

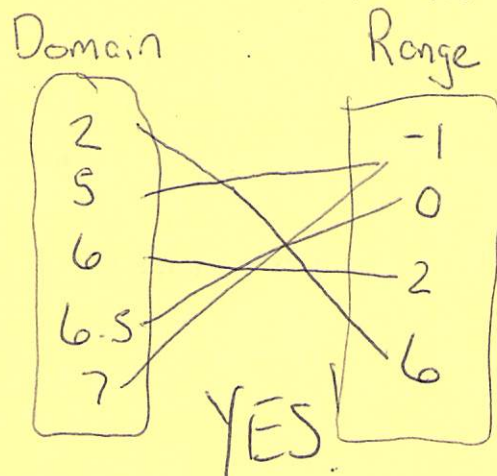
Use a mapping diagram to determine whether each relation is a function

3. $\{(3, -2), (8, 1), (9, 2), (3, 3), (-4, 0)\}$



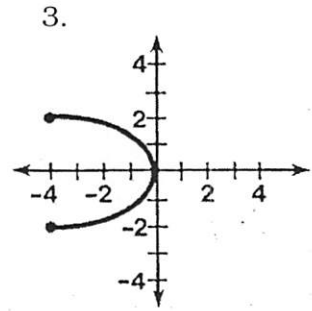
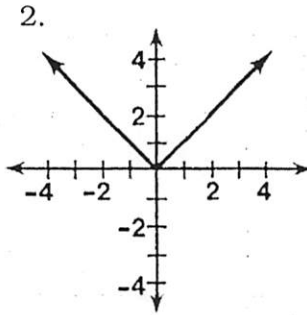
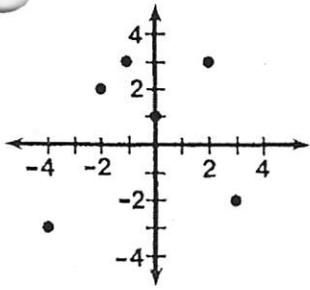
No!

4. $\{(6.5, 0), (7, -1), (6, 2), (2, 6), (5, -1)\}$



YES!

Use the vertical line test to determine whether each graph is the graph of a function.



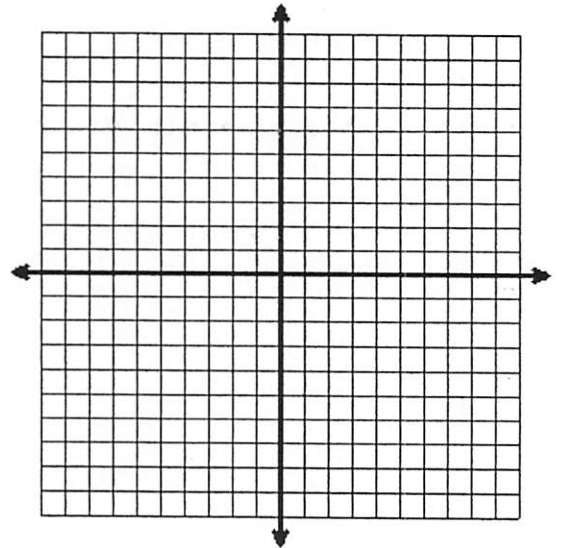
Determine whether each relation is a function. If the relation is a function, state the domain and range in brackets.

4.

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

5.

x	y
9	6
3	8
4	9.5
9	2



Use a mapping diagram to determine whether each relation is a function

6. $\{(-5, 1), (-3, 6), (-8, 0), (3, 4), (-4, 0)\}$

7. $\{(-3, 2), (-3, -3), (-3, 9), (-3, 6), (-3, -1)\}$