PRINCIPLES - LESSON 6D
FUNCTIONS

FUNCTION: (math nerd definition) a special relation in which each member of the domain is paired with exactly one member of the range

FUNCTION: (plain English definition) a set of points in which each x-coordinate is matched with exactly one y-coordinate (each input has exactly one output)

EVERY FUNCTION IS A RELATION.

NOT EVERY RELATION IS A FUNCTION.

FUNCTIONS

FUNCTION: a set of points in which each x-coordinate is matched with exactly one y-coordinate (each input has exactly one output)
(plain English definition)

Determine whether the relation below is a function. If it is not a function, tell why it is not.

ex1) $\{(-2, 4), (3, -2), (1, -5), (-2, 0)\}$

It is NOT a function because the x-coordinate -2 is paired with two y-coordinates.

FUNCTION OR NOT?

Determine whether each relation is a function. If it is not a function, tell why it is not.

ex2) $\{(1, -2), (7, -1), (0, 0), (3, 1)\}$

This is a function
Each x-coordinate
is paired with exactly
one y-coordinate.

ex3) $\{(3, 4), (2, 4), (-9, 4)\}$

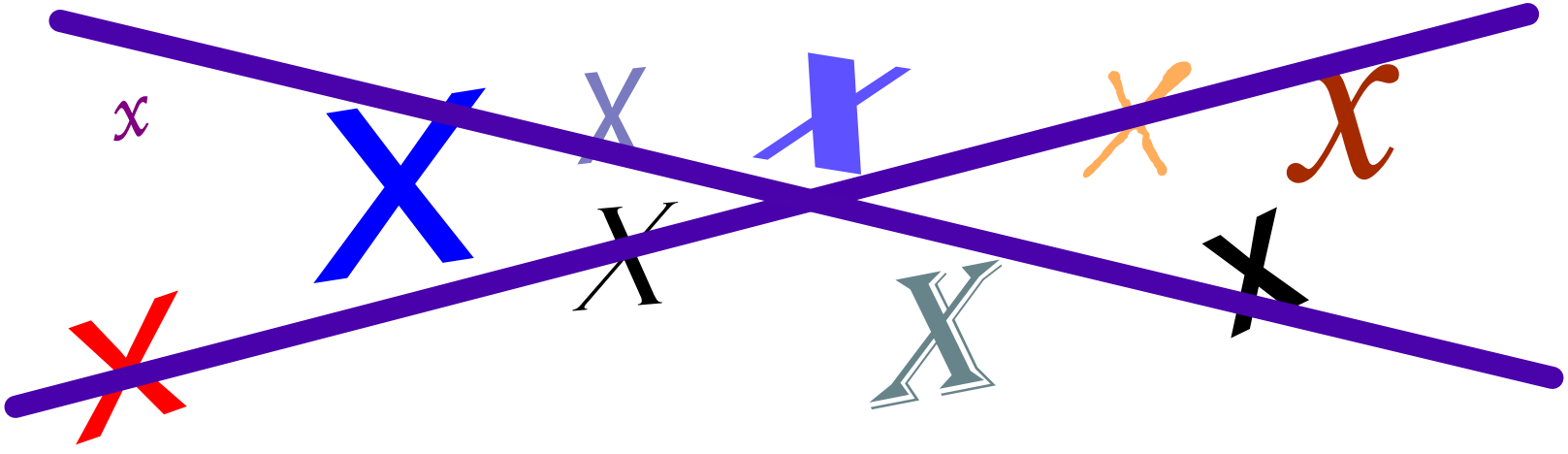
This is a function
Each x-coordinate
is paired with exactly
one y-coordinate.

ex4) $\{(7, 1), (-5, -2), (7, -3)\}$

This is NOT a function.
The x-coordinate 7 is
paired with two y-coordinates.

FUNCTION OR NOT?

A relation is a function only if there are NO repeating x-coordinates.



REPEATING X = NOT A FUNCTION

FUNCTION OR NOT?

Determine whether each relation is a function.

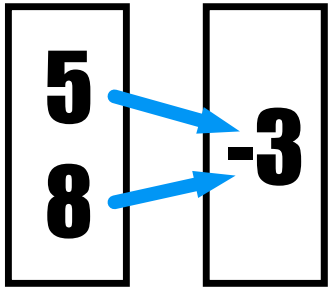
ex5)

x	y
-2	1
0	1
2	1

Function

(no x's repeating)

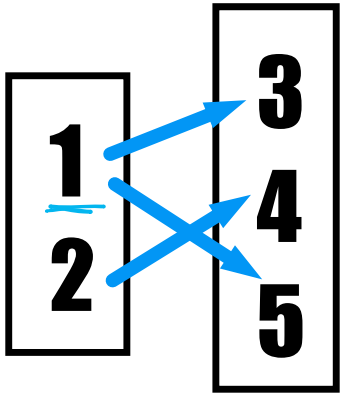
ex6)



Function

(no x's repeating)

ex7)



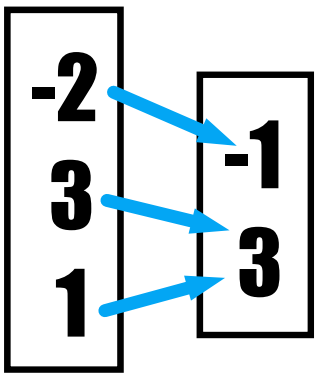
Not a function

(x-coordinate 1 is paired with two y-coordinates)

FUNCTION OR NOT?

Determine whether each relation is a function.

ex8)



Function

(no x's repeating)

ex9)

x	y
6	1
-1	2
2	1
4	2
-1	1

Not a function

(x-coordinate -1 is paired with two y-coordinates)

ex10)

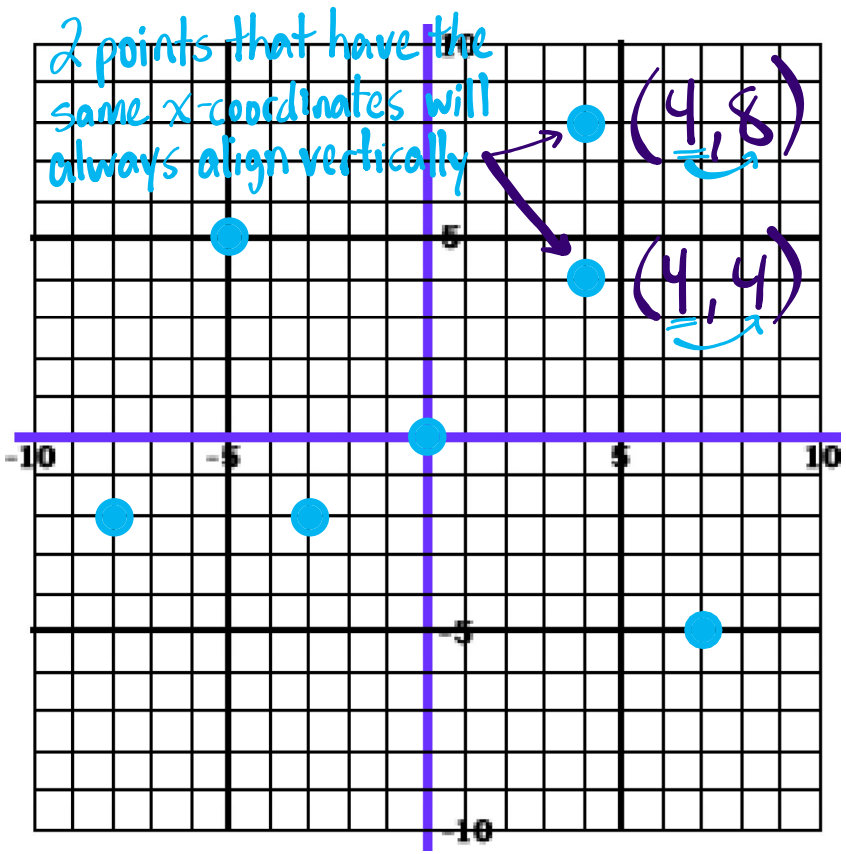
$\{(0,1),(1,2),(0,2)\}$

Not a function

(x-coordinate 0 is paired with two y-coordinates)

WHAT ABOUT RELATIONS EXPRESSED AS GRAPHS?

ex11) Determine whether this relation is a function.



Not a function

(x-coordinate 4 is paired with two y-coordinates)

VERTICAL LINE TEST

To test whether or not a graph is a function, use the VERTICAL LINE TEST.

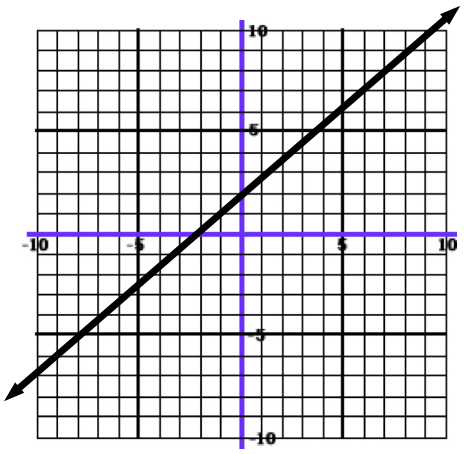
VERTICAL LINE TEST

If we can draw a vertical line ANYWHERE on a graph and it touches more than one point, then the graph is NOT A FUNCTION.

FUNCTION OR NOT?

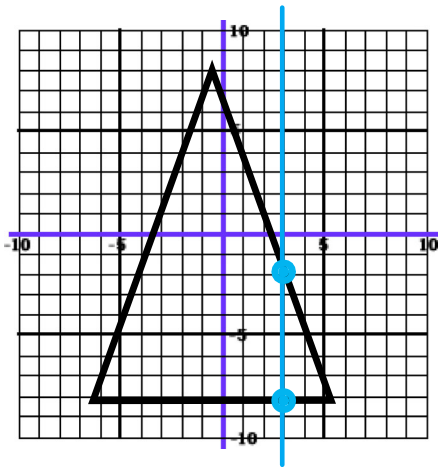
Determine whether each relation is a function.

ex12)



Function

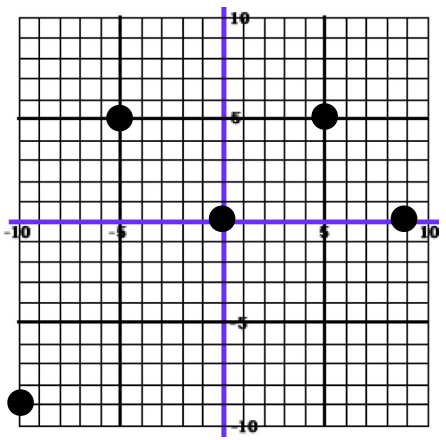
ex13)



Not a function

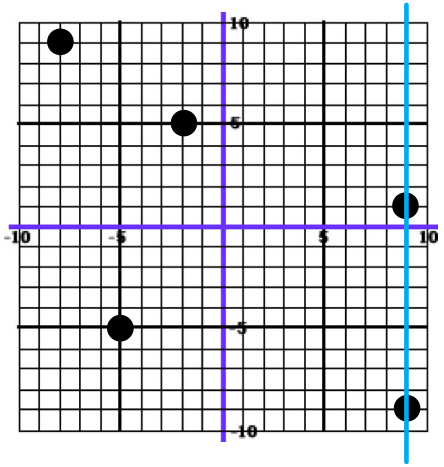
(fails vertical line test)

ex14)



Function

ex15)



Not a function

(fails vertical line test)