

## 2-1 Relations and Functions

- students will learn the how to determine the domain and range of a graph.
- students will learn how to determine if a relation is a function or not.
- F.IF.4 and F.IF.5

**Relation:** a set of ordered pairs.

- may be a **continuous** set of ordered pairs.
- may be a **non-continuous** set of ordered pairs.  
(discrete)

**Domain:** the set of x-coordinates of the ordered pairs of a relation.

- **independent variable**
- **input**

**Range:** the set of y-coordinates of the ordered pairs of a relation.

- **dependent variable**
- **output**

**Function:** a relation in which each element of the domain is paired with **exactly one** element of the range.

- domain **CANNOT** repeat

**function notation:** when an equation is written as a function.

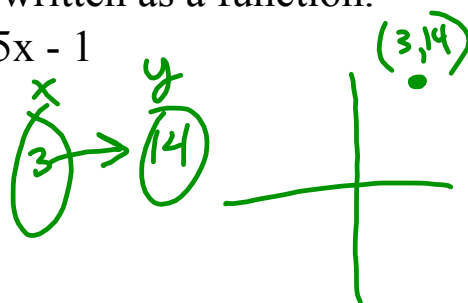
- $y = 5x - 1$  can be written as  $f(x) = 5x - 1$

- reads as "f of x"

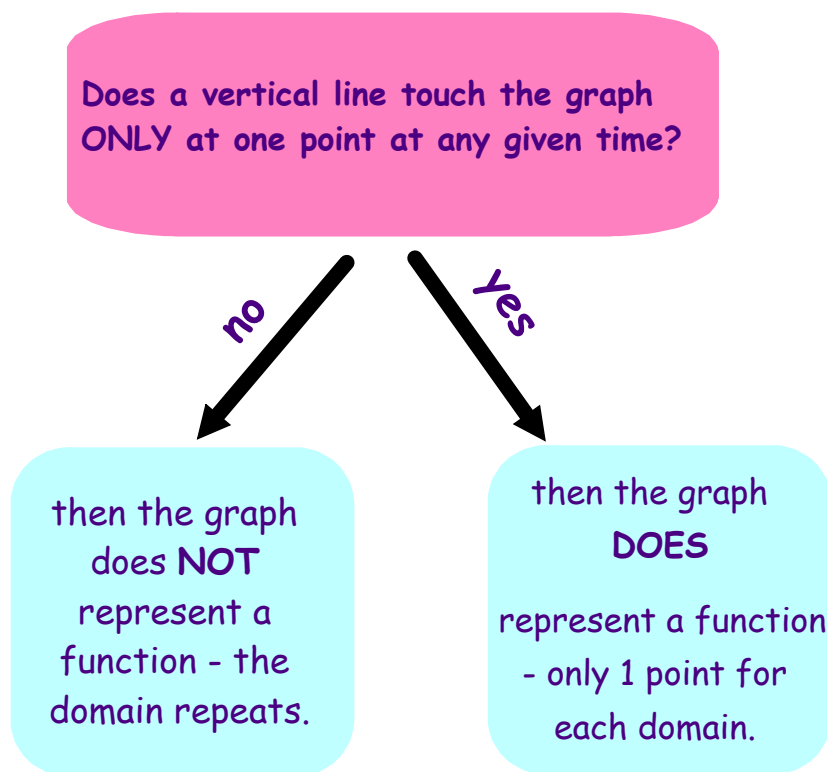
- $f(3) = \frac{5(3) - 1}{15 - 1}$

$$f(3) = 14$$

$$\begin{array}{r|l} x & y \\ 3 & 14 \end{array}$$



# vertical line test for a function



Determine the domain and range of the following relations. Then determine if the relation is a function or not.

(discrete relations)

- $R = \{(1, 2), (3, 4), (7, -1)\}$ 

$d: \{1, 3, 7\}$   
 $r: \{2, 4, -1\}$

function
- $T = \{(0, 3), (1, -3), (0, 4), (2, 5)\}$ 

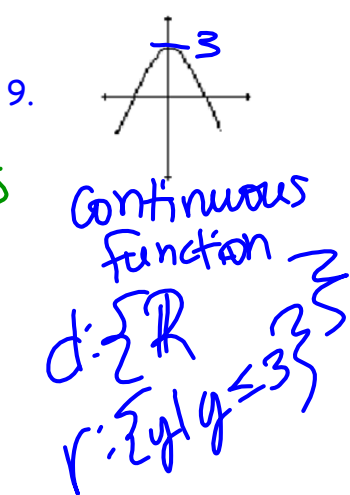
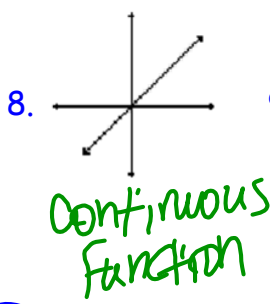
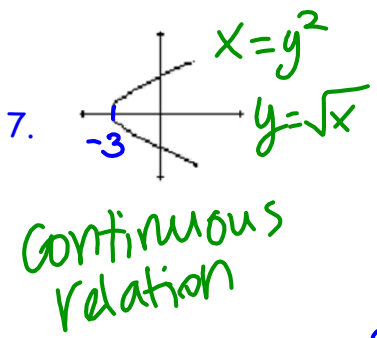
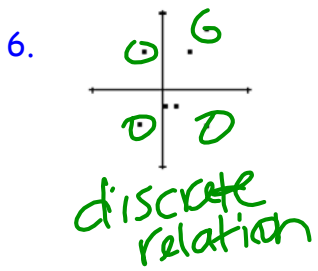
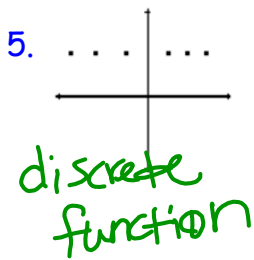
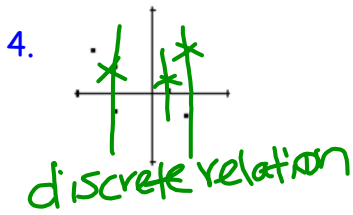
$d: \{0, 1, 2\}$   $r: \{3, -3, 4, 5\}$

not a function
- $V = \{(-1, 1), (2, 1), (3, 1)\}$ 

$d: \{-1, 2, 3\}$   
 $r: \{1\}$

function

Determine if the relation is a function or not. Then determine if it is continuous or discrete. (graphs)



$d: \{x | x \geq -3\}$   
 $r: \mathbb{R}$

$d: \mathbb{R}$   
 $r: \mathbb{R}$

$d: \mathbb{R}$   
 $r: \{y | y \leq 3\}$

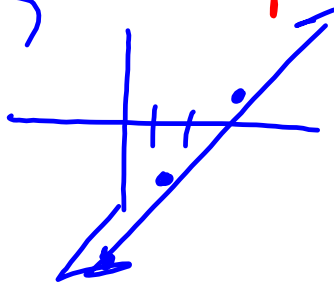
Determine the domain and range of the following relations. Then determine if the relation is a function or not.

(continuous relations)

10.  $y = 2x - 5$

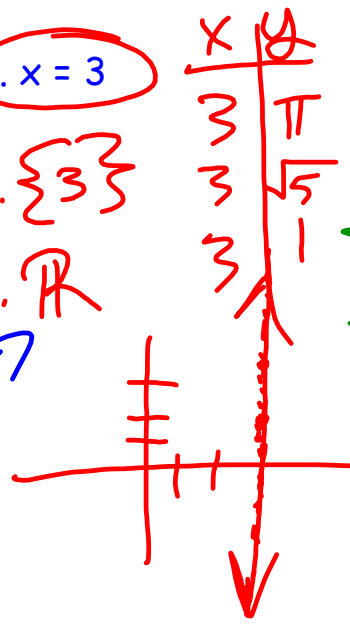
x	y
2	-1
0	-5
1	1

$d: \mathbb{R}$   
 $r: \mathbb{R}$

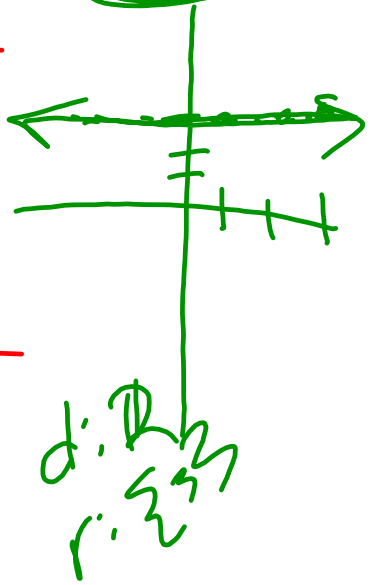


11.  $x = 3$

$d: \{3\}$   
 $r: \mathbb{R}$



12.  $y = 3$



Determine the domain and range of the following relations. Then determine if the relation is a function or not.

(tables & mappings)

13.

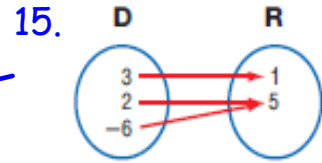
x	y
5	-2
10	-2
15	-2
20	-2

discrete  
 $d: \{5, 10, 15, 20\}$   
 $r: \{-2\}$   
 function

14.

x	y
2	-2
-1	-1
-2	0
-1	1
2	2

discrete  
 not a function  
 $d: \{2, -1, 2\}$   
 $r: \{-2, -1, 0, 1, 2\}$



function  
 discrete  
 $d: \{3, 2, -6\}$   
 $r: \{1, 5\}$



