value of coins = 1.35

* # of nickels (is) 1 less than twice # of dimes *

$n = 2d - 1$

let n = # of nickels

let d = # of dimes

$$\begin{cases} n = 2d - 1 \\ 5n + 10d = 135 \end{cases}$$

$$\begin{aligned} n - 2d &= -1 \\ 5n - 10d &= -5 \end{aligned}$$

$n = 7$

$d = 13$

let x = 1st int

y = 2nd int

$$\begin{cases} 2x + 3y = 9 \\ 3x + 2y = 1 \end{cases}$$

$x = -3$

$y = 5$

Quiz #6

E.Q.:

Why is the concept of a function important and how do I use function notation to show a variety of situations modeled by functions?

How do I interpret functions that arise in applications in terms of context?

How do I use different representations to analyze linear functions?

How do I build a linear function that models a relationship between two quantities?

How do I interpret expressions for functions in terms of the situation they model?

How do I interpret key features of graphs in context?

What is a function?

- An activity or purpose natural to or intended for a person or thing

- Work or operate in a proper or particular way

- A relationship or expression involving one or more variables.

Functions

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

There is **one and only one output** (y) with each input (x).

Vocabulary Recall

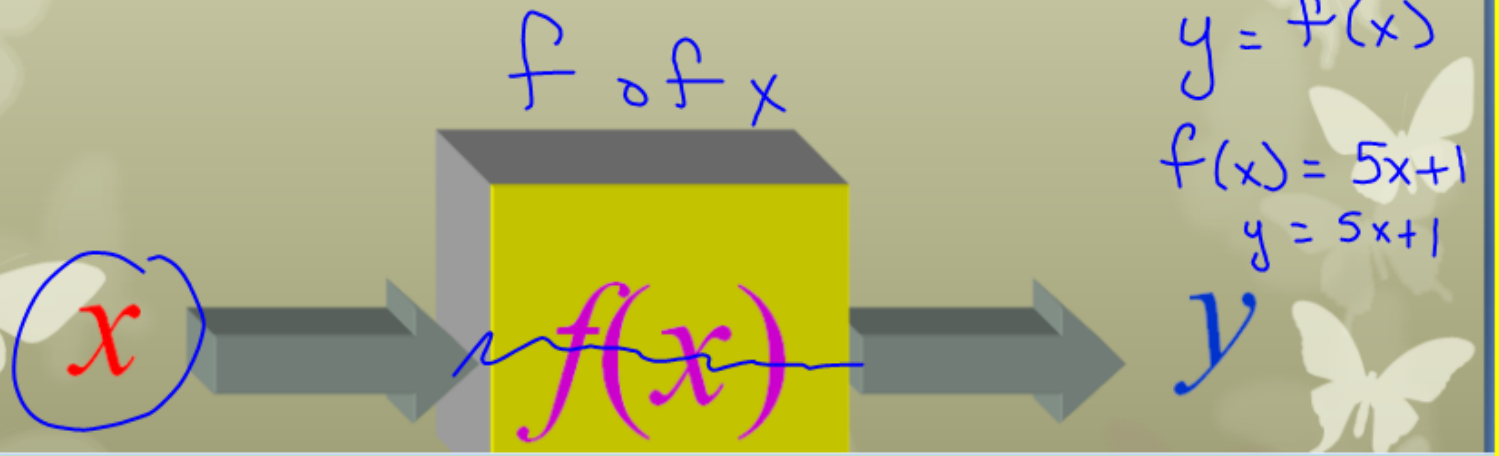
- **Domain** --- in a set of ordered pairs, (x, y), the *domain* is the set of all x-coordinates; also called "input"

- **Range** --- in a set of ordered pairs, (x, y), the *range* is the set of all y-coordinates; also called the "output"

VOCABULARY RECALL

Function --- each element of the ***domain*** is paired with ***exactly one*** element of the ***range***.

"**Machine**" uses "input" to give "output"



$y = f(x)$

$f(x) = 5x+1$

$y = 5x+1$

Given the following set of ordered pairs, find the domain and range.

Ex 1: {(2,3),(-1,0),(4,-5),(0,-3)}

Finite

D: $\{-1, 0, 2, 4\}$ R: $\{-5, -3, 0, 3\}$

Given the following set of ordered pairs, find the domain and range.

Ex 2: {(-2,4),(1,2),(4,3),(0,2)}

D
$\{-2, 0, 1, 4\}$

R
$\{2, 3, 4\}$

Determine whether each relation is a function. Explain.

1. {(2, 3), (3, 0), (5, 2), (4, 3)} Yes

2. {(4, 1), (5, 2), (5, 3), (6, 0), (1, 9)} No

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

Here are other ways to represent relations. Determine if these relations are functions.

We can represent functions with:

- tables
- mapping diagrams
- graphs

Table

1.

input

a	-3	-2	-1	0	1	2	3
b	1	-2	2	4	-3	-2	-1

output

Yes

2.

Animal	Average Lifetime (years)	Maximum Lifetime (years)
Cat	12	28
Cow	15	30
Deer	8	20
Dog	12	20
Horse	20	50

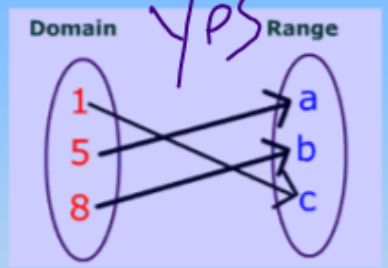
input output

No

Determine if these relations are functions.

Mapping

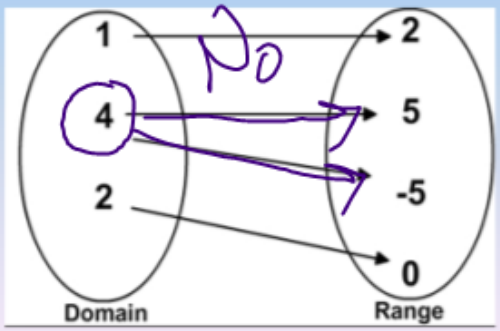
1.



YES

(1, c)
(5, a)
(8, b)

2.



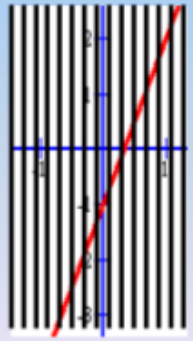
NO

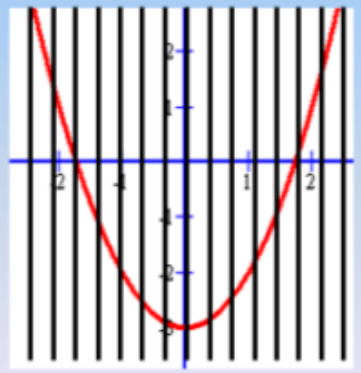
(1, 2)
(4, 5)
(4, -5)
(2, 0)

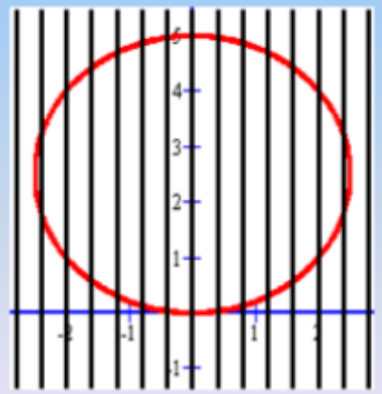
Vertical Line Test (VLT)

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

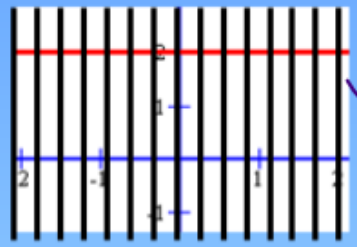
Are these relations functions?



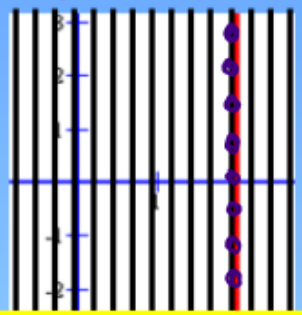




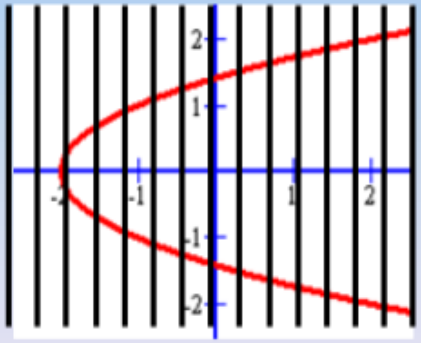
Determine if these relations are functions. Explain.

1. 

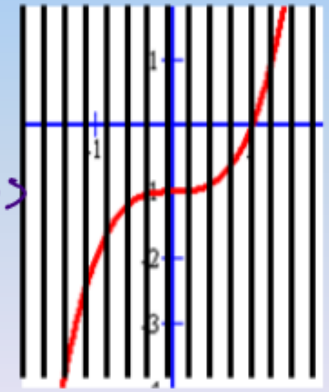
Yes

2. 

No

3. 

No

4. 

Yes

Stating the domain and range of a function

New Notation for Graphing on Number Lines:

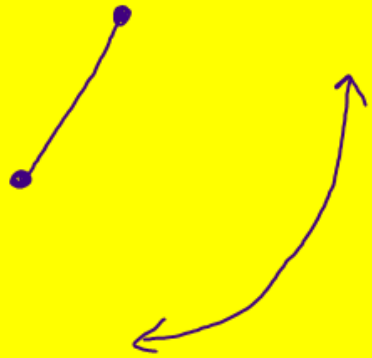
- **Parentheses:**
  endpoint not included <, >
- **Bracket:**
  endpoint included ≤, ≥

Writing Interval Notation from Graphs

Interval always written from smallest number to largest number

[(smallest #, largest #)]

Infinity: always use a parenthesis



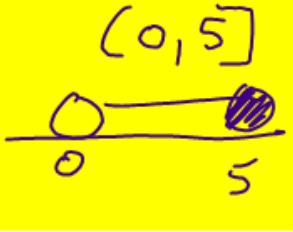
Infinite Set of Points

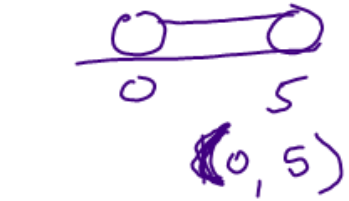
[0,5]

[0,5)

(0,5]

(0,5)





[0,5)

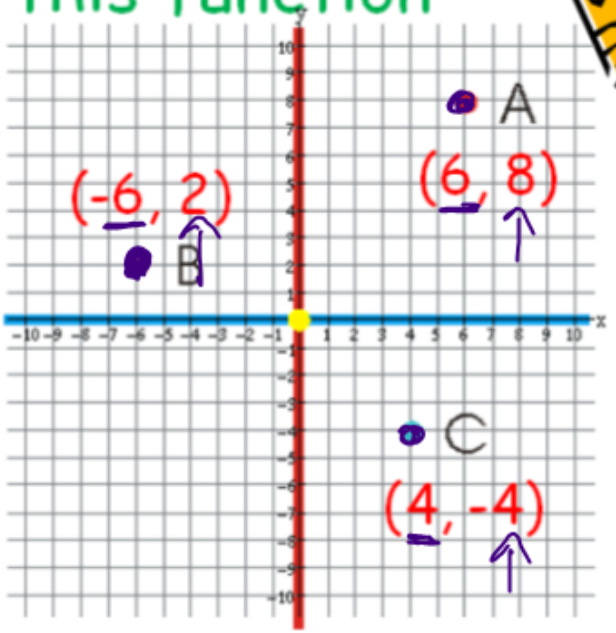
RECALL: State the Domain and Range of this function

Domain:

{-6, 4, 6}

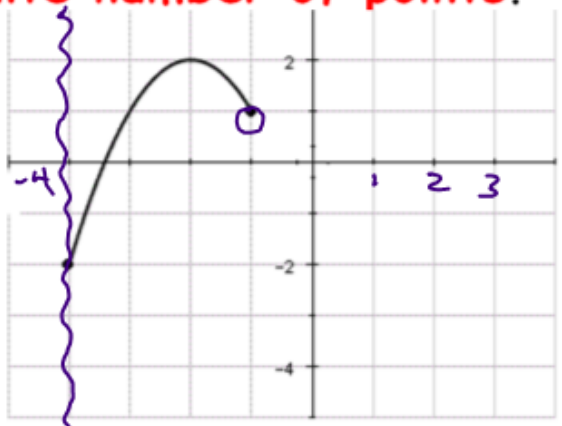
Range:

{-4, 2, 8}



Sometimes the set of ordered pairs from a graph may be an **infinite number of points.**

Ex 1



Infinite Points

State the Domain and Range from a Continuous Graph

Domain: Identify Far Left Point

Domain: Identify Far Right Point

Domain: Write the x-coordinates from smallest to largest.

Inequality Notation:

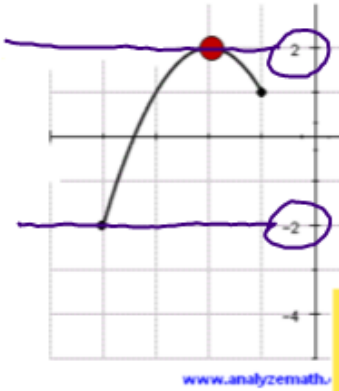
$-4 \leq x \leq -1$

Interval Notation:

$[-4, -1]$

State the Domain and Range from a Continuous Graph

Range: Identify **Maximum** Point



Range: Identify **Minimum** Point

Range: Write the y-coordinates from smallest to largest

Inequality Notation:

$-2 \leq y \leq 2$

Interval Notation:

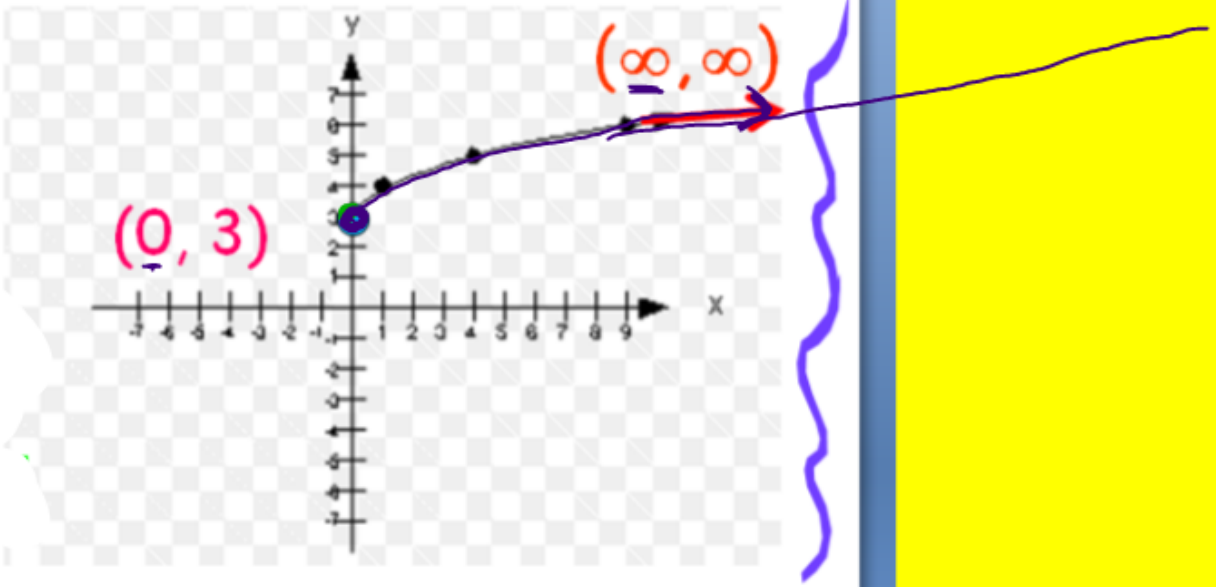
$[-2, 2]$

State the Domain and Range from a Continuous Graph

Ex 2

Domain:

$[0, \infty)$



Range:

$[3, \infty)$

[redacted]

S[redacted]ain and Range
[redacted]nuous Graph

Ex 3

Domain:

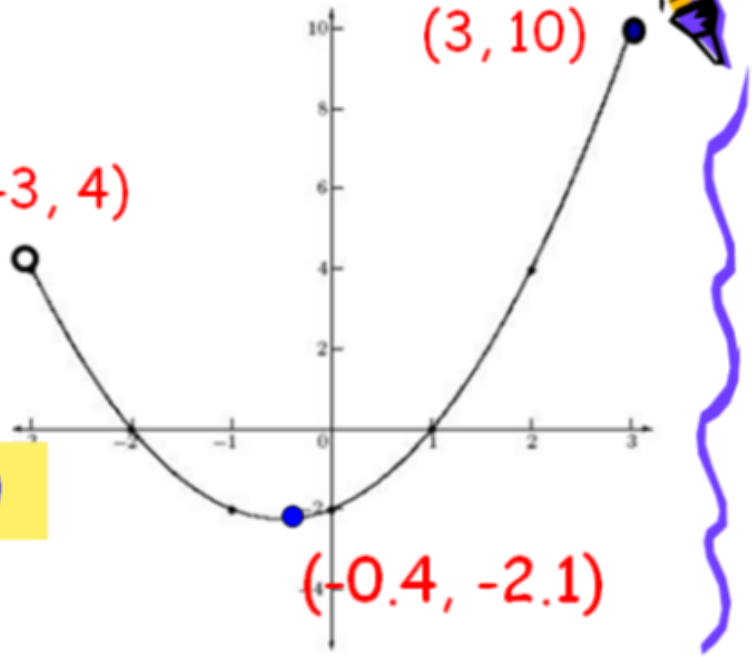
$-3 < x \leq 3$

$(-3, 3]$

Range:

$-2.1 \leq y \leq 10$

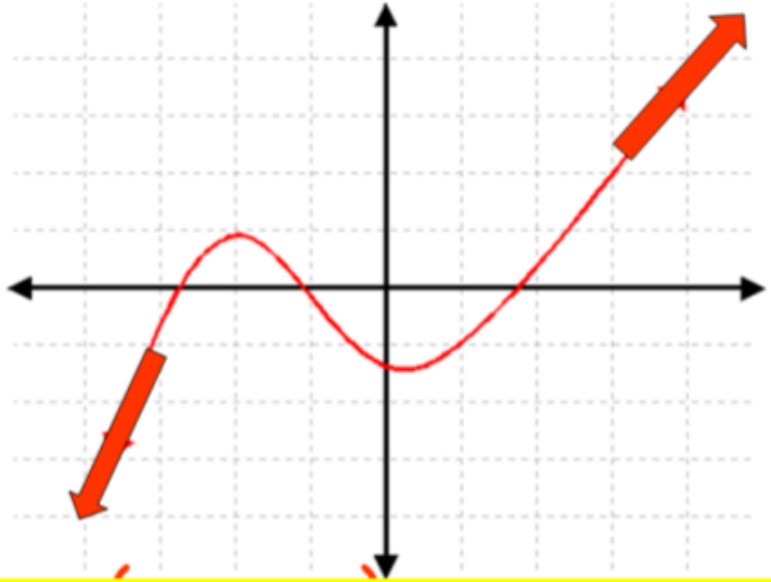
$[-2.1, 10]$



[redacted]

State the Domain and Range from a Continuous Graph

Ex 4

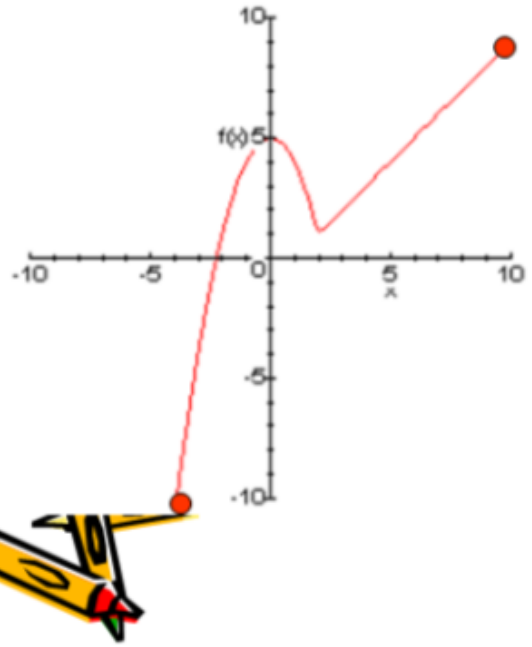


Domain:

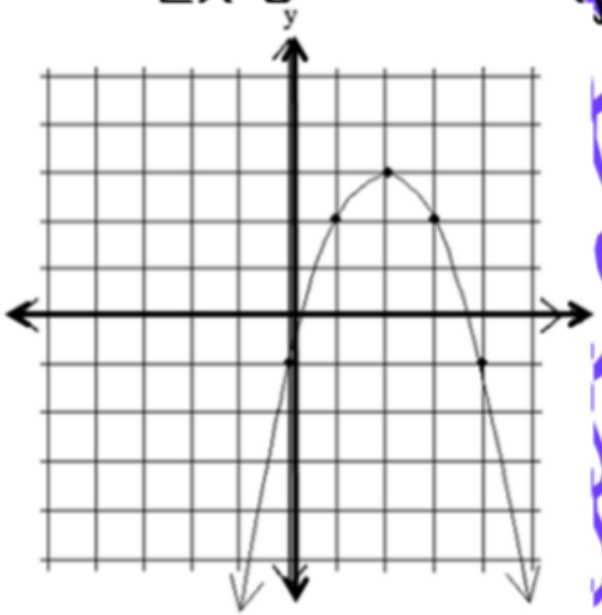
Range:

Try These on Your Own:

Ex 5



Ex 6



Worksheet
State Domain and Range Of Functions

10 minutes