2-1 Functions

Objectives: I can use set and interval notation when describing domain and range and when listing elements
in a set.

I can identify whether a graph represents a function by using the vertical line test.

I can identify and notate key features of a graph including: domain, range, increasing, decreasing and where a graph is constant.

Vocabulary: Union, Intersection

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Set Notation

- notation used to represent a group of values (elements)

2 ways to use set notation

1. {list each element in the set}

examples:

Who are the students sitting in your row?

What are the shoe sizes of the students in your row?

Sep 2-4:40 PM

List each element in the set of all whole numbers greater than or equal to 5.

Sep 14-5:50 PM

When your set is too large to list!

2. {variable being defined | variable description}

| means "such that"

$\{x \mid x \geq 5\}$

examples:

How much money can a person earn in a lifetime?

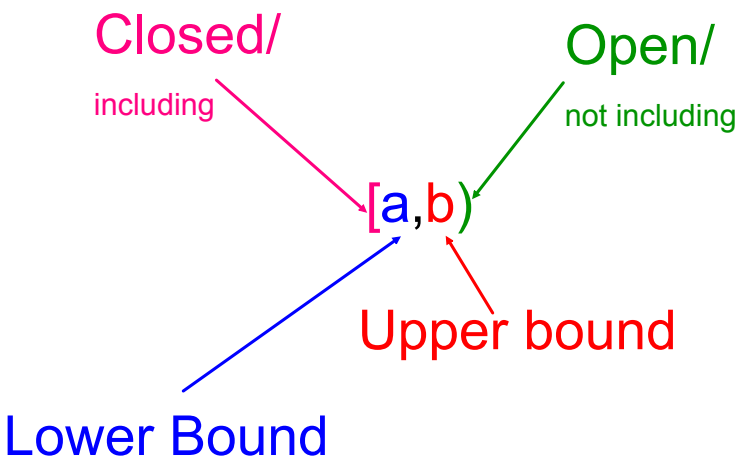
All numbers less than 7.

Aug 28-9:36 AM

List each element in the set of all real numbers greater than or equal to 5.

Mar 9-1:54 PM

Interval Notation



If the interval goes on forever we can use the infinity symbol (∞)

Mar 9-1:55 PM

Set

Interval

$\{x \mid -2 \le x < 4\}$

$\{x \mid x < 3\}$

$\{x \mid x < -3 \cup x \ge 7\}$

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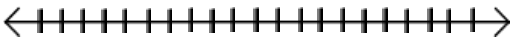
Set

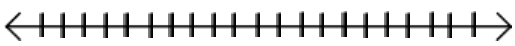
Interval

$[-2,\infty)$

$[5,12)$



$(-\infty,-4) \cup [32,101)$



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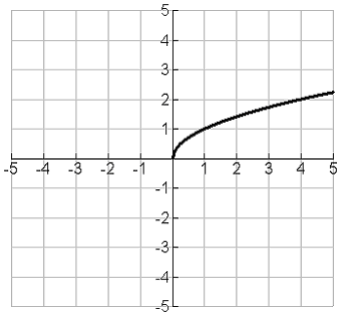
Domain & Range

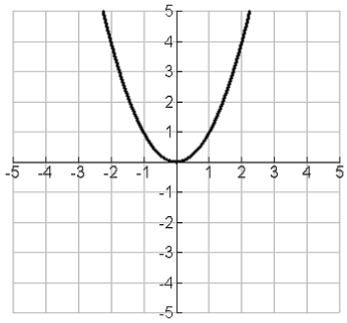
Domain: The set of all inputs
"the set of all x-values" (when applicable)
"independent variable"

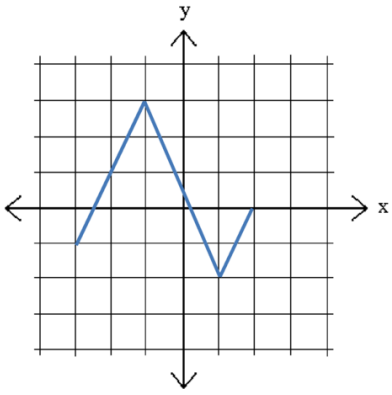
Range: The set of all outputs
"the set of all y-values" (when applicable)
"dependent variable"

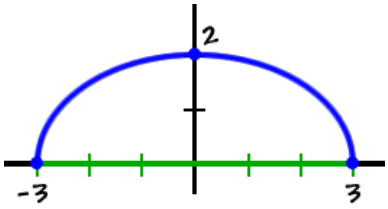
Sep 16-8:09 AM

Find the D & R:









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Increasing, Decreasing and Constant

- as you move from left to right the y-values increase (the graph is going up)
- as you move from left to right the y-values decrease (the graph is going down)
- as you move from left to right the y-values do not change (the graph is flat)

this behavior is reported using interval notation for the x-values where the graph has a given behavior

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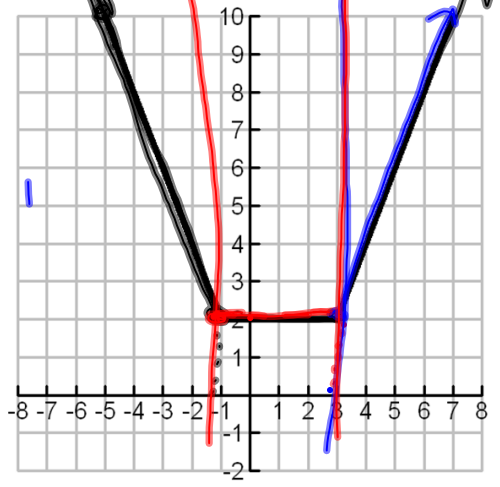
Give the intervals for increasing, decreasing, and constant behavior:



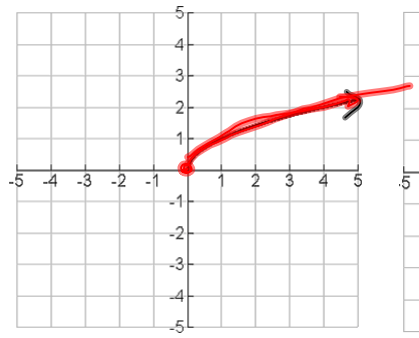
Dec: $(-\infty, -1)$

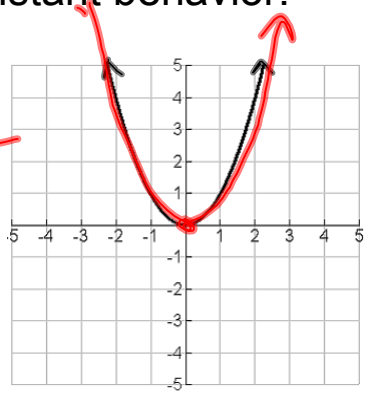
Const: $(-1, 3)$

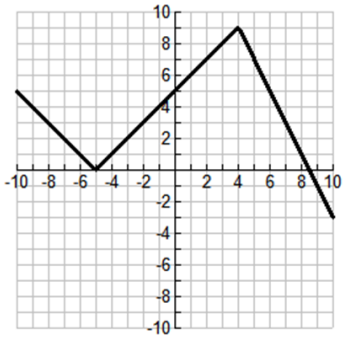
Inc: $(3, \infty)$

Aug 28-12:18 PM

Give the intervals for increasing, decreasing, and constant behavior:







Inc: $(0, \infty)$

Dec: Not Dec

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Function:

Function: when each domain value is paired with only one range value (no repeating x's)

- graphically: passes the vertical line test

Function notation: f(x) "f of x"

means: function named f is written using x's

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Example:

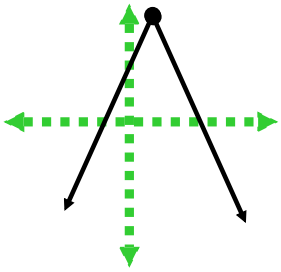
$$f(x) = 3x + 2 \qquad x = 9$$

$$f(9) = 29$$

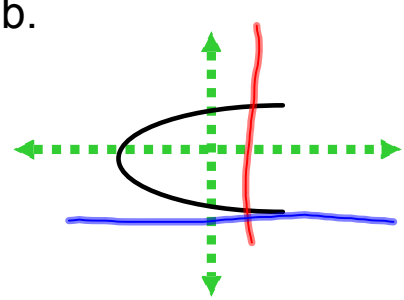
input output

Jul 28-2:20 PM

a.



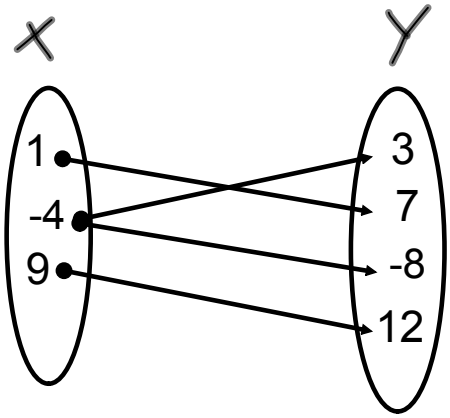
b.



c.

x	y
2	1
4	2
6	3
8	4
8	3

d.



e.

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

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Evaluate for a specific value:

$$f(x)=3x-5$$

$x = -2$ $f(-2)=3(-2)-5$

$f(-2)=-6-5$

$f(-2)=-11$

$f(3)=3(3)-5$

$f(3)=9-5$

$f(3)=4$

$f(-4)=$

Sep 16-9:02 AM

Sep 15-7:48 AM