

# Table of Contents

Date(s)	Title/Topic	Page #s
8/29	0.6 Function Investigation	24-25

**Set up p. 24 for HW and p. 25 for notes**

## HW

Is anyone interested in a second job as a tutor for our Classroom Economy?

24

## 0.6 Function Investigation

Formative Assessment Fri over IF1, IF2, IF3, IF4  
The real deal will be Wed.

25

## Key Features of Functions

- x-intercepts  $(x, 0)$  and y-intercepts  $(0, y)$
- domain and range
- intervals of increasing, decreasing, and constant behavior
- parent equation/family of functions
- maximum and minimum
- symmetry
- end points (vertex?)
- asymptotes

$$y = \frac{1}{x-h} \quad y = \sqrt{x}$$

$$y = x^2 \quad \text{Quadratic}$$

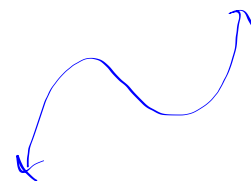
$$y = |x|$$
$$y = mx + b \quad \text{Linear}$$
$$y = x \quad y = x^3$$

**Using your graphing calculator to make a scatterplot**

22x16 data

x	y
1	280
2	432
3	480
4	448
5	360

Stat  
EDIT  
1. Edit...



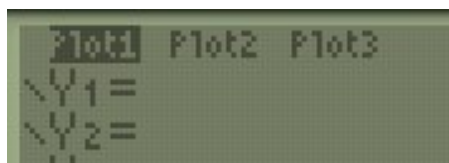
Enter your x-values into L1 and your y-values into L2.

To turn the scatterplot on...go to 2nd Y= or STAT PLOT.

Hit ENTER ENTER to turn the plot ON. Then, hit ZOOM 9 to fit your window to the data.

**ALWAYS TURN YOUR PLOTS OFF WHEN DONE**

Y = up arrow ENTER



**x-intercepts**



**write as  
ordered  
pairs**

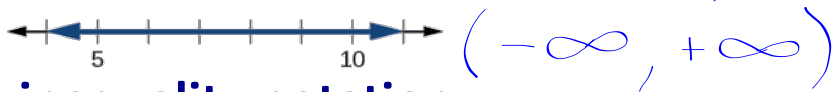
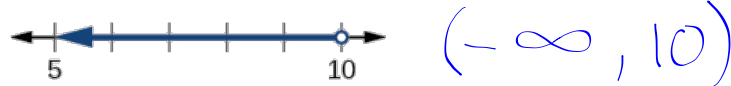


**y-intercepts**

- where the graph crosses the x-axis
  - To find it algebraically, set  $y = 0$  and solve for  $x$
  - also known as:
    - > roots
    - > zeros
- 
- where the graph crosses the y-axis
  - To find it algebraically, set  $x = 0$  and solve for  $y$

notation -  
used for  
domain/range  
and increasing/  
decreasing

examples:



inequality notation

$5 < x \leq 10$  /  $x < 10$  /  $-\infty < x < \infty$

~~set-builder notation~~

interval notation

open circle

closed circle

exclusive

inclusive

( )

[ ]

*excluded*

*included*

## Types of Function Behavior

1) Increasing

\* As x increases, y increases \* direct relationship

2) Decreasing

\* As x increases, y decreases \* inverse relationship

3) Constant

\* As x increases, y stays the same

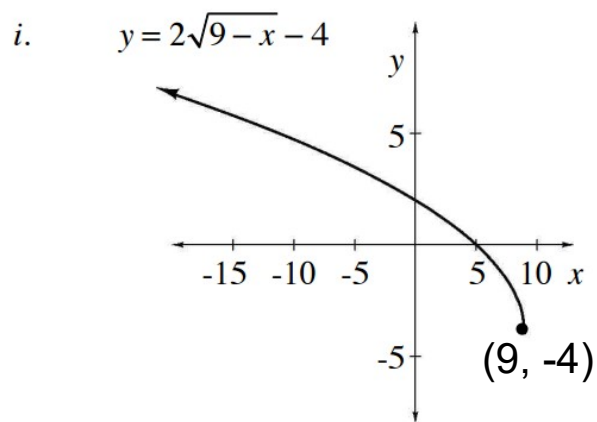
**When determining the type of behavior,  
always move from left to right on the graph!**

### Identifying Intervals of Behavior

We use interval notation

The interval measures x-value

The type of behavior describes the y-values



- domain and range
- x-int and y-int
- increasing/decreasing
- max and min (for y only)
- end points?

## How can I investigate a function?



### Function Investigation

What does it mean to describe a function completely? In this lesson you will graph and investigate a family of functions with equations of the form  $f(x) = \frac{1}{x-h}$ . As you work with your team, keep the multiple representations of functions in mind.

#### 1-78. INVESTIGATING A FUNCTION, Part One

Your team will investigate functions of the form  $f(x) = \frac{1}{x-h}$ , where  $h$  can be any number.

As a team, choose a value for  $h$  between  $-10$  and  $10$ .  
For example, if  $h = 7$ , then  $f(x) = \frac{1}{x-7}$ .

**Your Task:** On a piece of graph paper, write down the function you get when you use your value for  $h$ .



**For this problem, every group will choose  $h = 2$**

Then make an  $x \rightarrow y$  table and draw a complete graph of your function. Is there any more information you need to be sure that you can see the entire shape of your graph? Discuss this question with your team and add any new information you think is necessary.

### *Discussion Points*

How can we be sure that our graph is complete?

How can we get output values that are greater than 1 or less than  $-1$ ?



## Work on Problem 1 in teams.

*make sure to choose a variety of values for x!*  
*what input gets out 1, -1, 2, -2, 5, -5, 10, -10?*



hint: try 2.5 for x

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## Completely describe the function.

### Key Features

- domain and range
- x-int and y-int
- shape of graph
- max and min
- end points or asymptotes

equation

$$y = \frac{1}{x - 2}$$

table

graph

key  
features

equation  $y = \frac{1}{x - 2}$  graph

table

x	y
0	-0.5
1	-1
2	-
3	1
4	0.5
6	0.25
2.5	2
1.5	-2
2.1	10
2.2	5
1.9	-10
1.8	-5

- *what can't you plug in for x?*
- *what value will never come out for y?*

key features

- domain:  $x \neq 2$
- range:  $y \neq 0$
- asymptotes at  $x = 2$  and  $y = 0$
- x-int: none
- y-int: (0, -0.5)
- shape of graph - hyperbola
- no max, no min

