#### Created by Mr. Lischwe Warmup 9/**(# of letters in "quattuordecillion"**)

• A certain company keeps track of some people's home phone numbers. Here is a sample:

Customer Name	Home Phone Number
Heather Baker	310-510-0091
Mike London	310-520-0256
Sue Green	323-413-2598
Bruce Swift	323-413-2598
Michelle Metz	213-806-1124

- Let "P" be the rule that takes each customer and states their home phone number. Is "P" a function? Why or why not?
- 2) Let "C" be the rule that takes each home phone number and states the customer name who owns it. Is "C" a function? Why or why not?



### Is this a function?



Look at your graphing functions worksheet (you should have just gotten it back)

### ONE IMPORTANT THING TO NOTICE...

 Did any of your graphs turn out to NOT BE FUNCTIONS?

• Why do you think this happened???

#### • EXTREMELY IMPORTANT:

 With each of these equations, if you plug ONE number in, you will get ONE number out. You will never get two outputs! This is why all of these graphs are functions.

# Exploration: When will a function be linear, and when will it be nonlinear?

- Handout
- THE GOAL: Explore <u>for yourself</u> and figure out some rules for when an equation will be linear or nonlinear
- In each pair, one of you will be the "typer" and one of you will be the "writer". If you both want to be one of them, then make it fair and switch halfway through.

#### Table of Contents

- p. I Converting Fractions and Decimals (1.1)
- p. 2 Roots (1.8 & 1.9)
- p. 3 Solving x<sup>2</sup> and x<sup>3</sup> Equations (1.8)
- p. 4 Rational vs. Irrational (1.1)
- p. 5 What is a function?
- p. 6 Function Notation: f(x)
  - **5.7 Linear vs. Nonlinear Functions**

#### **Linear vs. Nonlinear Functions**

#### **Objectives:**

- -Predict if an equation will be linear or nonlinear
- -Predict if a table will be linear or nonlinear
- -Learn a strategy to help figure out a rule

When will an equation be linear, and when will it be nonlinear???

### • Theories???

1	COPY:	
	Linear Equations	Nonlinear Equations
	Anything using the pattern f(x) = x + f(x) = x - f(x)	Exponents other than I
	Anything without > any of that stuff	Variable inside a square root
		Variable in a denominator
		Variable inside an absolute value
	x <sup>2</sup> A These all look like	graphs look like bsolute value graphs look like



### **IMPORTANT:**

• Diagonal lines ARE considered "straight lines!!!"

- Straight: 🔶
- Also straight:



# f(x) = 4x + 3



 $f(x) = x^2 - 4$ 



# $f(x) = \frac{x}{5} + 4$



# $f(x) = \frac{6}{x} - 2$





# f(x) = 100 - x



# f(x) = 5x - 2x



# Linear or Nonlinear? $f(x) = -\frac{3}{4}x + \frac{1}{7}$



# $f(x) = 4\sqrt{x} - 3$



# f(x) = |2x + 10|Nonlinear



f(x) = 6



 $f(x) = (4x - 3)^2$ 





f(x) = x(x-4)

# Nonlinear (turns into $f(x) = x^2 + 4x$ )

 $f(x) = 2x^3 - \sqrt{x} + |x - 4| + \frac{3}{x}$ 



# 2x + 4y = 5



# $y = 3x + \sqrt{2}$