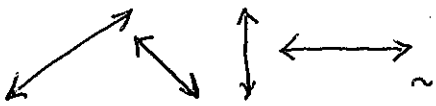
Name _____ Date _____

3.2 Learning Target: Understand how to graph linear functions.

I can identify linear functions using graphs, tables, and equations.
I can graph linear functions using discrete and continuous data.
I can write and analyze linear equations that model/fit data.

Write the meaning of each vocabulary term.

linear equation in two variables (x+y usually) - an equation that can be written in the form $y=mx+b$



~ the graph of a linear equation is a line if D is $\mathbb{R}$.

linear function – a function whose graph is a non-vertical line.

$\frac{\Delta y}{\Delta x} = \frac{\Delta \text{dep. var.}}{\Delta \text{ind var}}$ = average rate of change for linear functions this is CONSTANT.

nonlinear function – a function that does not have constant rate of change
– the graph is not a line/not line-like

solution of a linear equation in two variables – is an ordered pair (x, y) that makes the equation true
– the graph of a linear equation is the set of all ordered pairs that make the equation true.

discrete domain

- a set of input values that consists of only certain numbers in an interval

"points"

continuous domain

- a set of input values thats consists of all numbers in an interval.

" line
line segment "

Name _____ Date _____

3.2 Notetaking with Vocabulary (continued)

Core Concepts

Representations of Functions

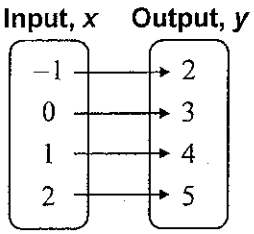
Words An output is 3 more than the input.

Equation $y = x + 3$

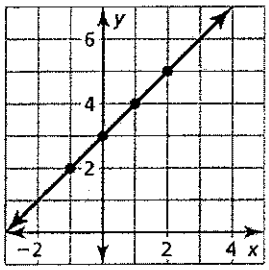
Input-Output Table

Input, x	Output, y
−1	2
0	3
1	4
2	5

Mapping Diagram



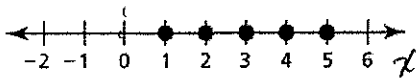
Graph



Discrete and Continuous Domains

A **discrete domain** is a set of input values that consists of only certain numbers in an interval.

Example: Integers from 1 to 5



D: {1, 2, 3, 4, 5}

A **continuous domain** is a set of input values that consists of all numbers in an interval.

Example: All numbers from 1 to 5

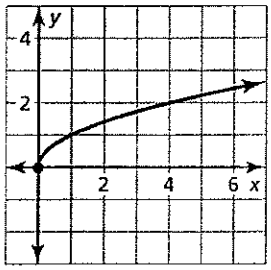
D: $\{1 \leq x \leq 5\}$

Name _____ Date _____

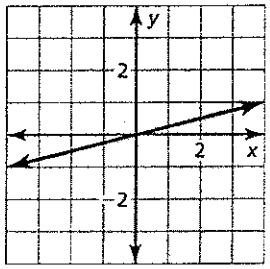
3.2 Notetaking with Vocabulary (continued)

Practice

In Exercises 1 and 2, determine whether the graph represents a *linear* or *nonlinear* function. Explain.

1. 

The function is nonlinear b/c the graph is not a line.

2. 

The function is linear b/c the graph is a line.

In Exercises 3 and 4, determine whether the table represents a *linear* or *nonlinear* function. Explain.

3.

x	1	2	3	4
y	−1	2	5	8

+1 +1 +1

+3 +3 +3

$\frac{\Delta y}{\Delta x} = \frac{3}{1}$

The function is linear b/c the average rate of change is constant.

4.

x	−1	0	1	2
y	0	−1	0	3

+1 +1 +1

−1 +1 +3

The function is NOT linear b/c the average rate of change is not constant.

In Exercises 5 and 6, determine whether the equation represents a *linear* or *nonlinear* function. Explain.

5. $y = 3 - 2x$ $= -2x + 3$

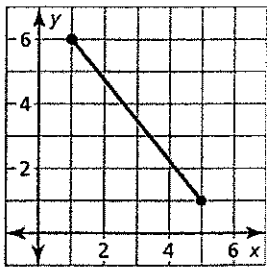
yes b/c it can be written in slope-intercept form.

6. $y = -\frac{3}{4}x^3$

the 3 in the exponent is the problem

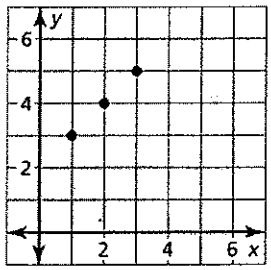
No the equation does not represent a function because it can't be written in $y = mx + b$.

In Exercises 7 and 8, find the domain of the function represented by the graph. Determine whether the domain is *discrete* or *continuous*. Explain.

7. 

D: $\{1 \leq x \leq 5\}$

Continuous

8. 

D: $\{1, 2, 3\}$

discrete.