

## Unit 4: Introduction to Functions

Dear Parents/Guardians,

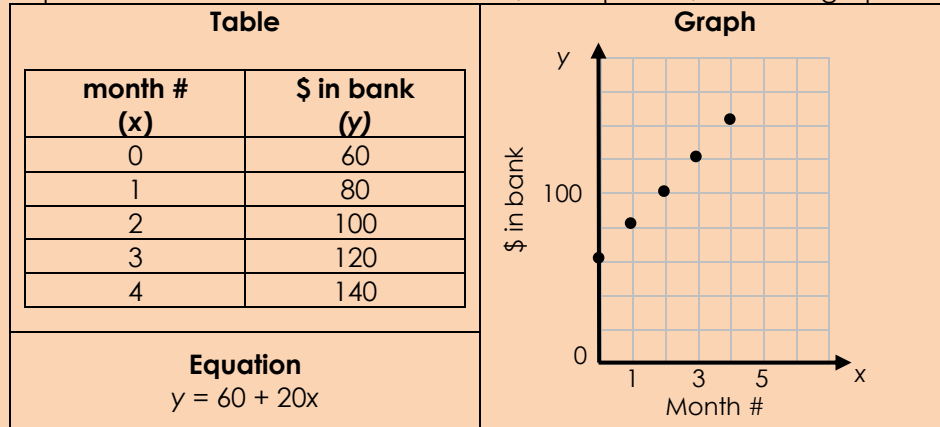
Unit 4 introduces functions. In Lesson 1, students represent situations with words, pictures, tables, graphs, and equations. They determine when graphs are linear or non-linear. In Lesson 2, students formally define functions and determine if a representation is a function. In Lesson 3, students solve problems involving rates, using the representations from previous lessons.

### Multiple Representations

Students interpret situations involving changes in area and money over time using a variety of representations.

Example: Nathan initially had \$60 in his bank account. Every month he deposits another \$20 into his account.

Represent Nathan's situation as a table, an equation, and in a graph.



### Functions and Non-Functions

A function is a rule that assigns each input value exactly one output value. Below are four representations commonly studied when determining if a given relationship among two quantities is a function. (The red highlights where the relationship is not a function.)

	Function	Not a Function																				
Table of Numbers	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">x (input)</td> <td style="text-align: center;">2</td> <td style="text-align: center;">-1</td> <td style="text-align: center;">4</td> <td style="text-align: center;">-2</td> </tr> <tr> <td style="text-align: center;">y (output)</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">-2</td> </tr> </table>	x (input)	2	-1	4	-2	y (output)	1	3	3	-2	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">x (input)</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3</td> <td style="text-align: center;">-2</td> </tr> <tr> <td style="text-align: center;">y (output)</td> <td style="text-align: center;">2</td> <td style="text-align: center;">0</td> <td style="text-align: center;">4</td> <td style="text-align: center;">-1</td> </tr> </table>	x (input)	1	1	3	-2	y (output)	2	0	4	-1
x (input)	2	-1	4	-2																		
y (output)	1	3	3	-2																		
x (input)	1	1	3	-2																		
y (output)	2	0	4	-1																		
Mapping Diagram																						
Ordered Pairs	(2,1), (-1,3), (4,3), (-2,-2)	(1,2), (1,0), (3,4), (-2,-1)																				
Graph																						



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GRADE 8

**By the end of the unit, your student should know...**

- How to represent situations with words, pictures, tables, graphs and equations [Lesson 4.1]
- When a graph is linear or nonlinear, and when it is increasing or decreasing [Lesson 4.1]
- The definition of a function [Lesson 4.2]
- When a representation is a function [Lesson 4.2]
- How to solve and interpret rate situations with words, pictures, tables, graphs, and equations [Lesson 4.3]

### Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.