PIECEWISE FUNCTIONS

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INSTRUCTIONS FOR THE STUDENT

NCTM EXPECTATIONS THAT ARE MET BY THIS ACTIVITY – GRADES 9-12
After completing this activity, the students should be able to
* Interpret representations of functions of two variables;
* Use symbolic algebra to represent and explain mathematical relationships;
* Judge the meaning, utility and reasonableness of the results of symbol manipulations, including those carried out by technology;
* Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships.

PUERTO RICO INDICATORS THAT ARE MET BY THIS ACTIVITY – 10th GRADE
After completing this activity, the students should be able to
A.PR.10.8.1   Analyze a situation to determine and interpret the domain and range of a piecewise function;
A.PR.10.8.2 Interpret, construct and apply the floor and ceiling functions, and other piecewise functions such as the absolute value function, to model and solve problems;
A.PR.10.8.3 Transit between verbal, graphical, tabular and symbolic representations of the floor and ceiling functions and other piecewise functions.

CONCEPTS

Piecewise functions

Floor and ceiling functions

Range and domain of functions

Verbal, graphical, tabular and symbolic representations of piecewise functions

Modeling of situations using piecewise functions

MATERIALS

TI-Nspire with activity **piecewise_functions.tns**

A copy of this document

INTRODUCTION

This activity is aimed for high school students and university students enrolled in a pre-calculus course. The goals of this activity are:
* To establish the connection between a situation and its graphical representation;
* To establish the importance of the different representations of a situation;
* To model a situation mathematically.

INSTRUCTIONS

Choose a classmate to work with. Every student should have a copy of this document and the TI-Nspire. Open the archive **piecewise_functions.tns.** Read the instructions below and answer every question with the help of the TI-Nspire.
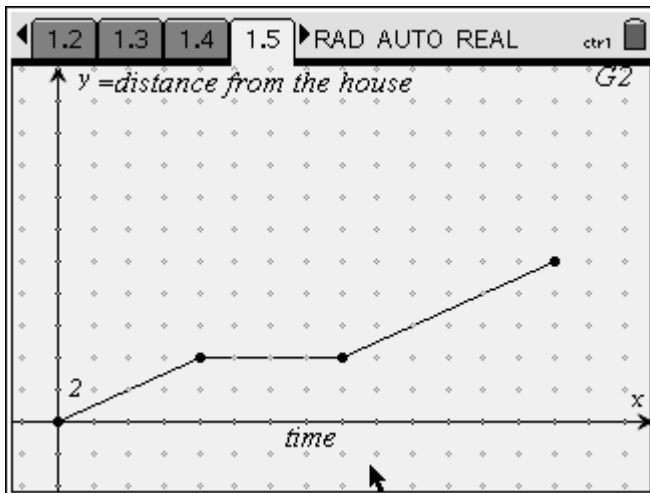
Problem #1

1. Mrs. Smith lives in Brooklyn, New York. She goes out early each day in the morning. The graphs represent Mrs. Smith's displacement around the city throughout different days. The horizontal axis represents the time since she left the house.   The vertical axis represents the distance between Mrs. Smith and her house. Write a story for each graph.
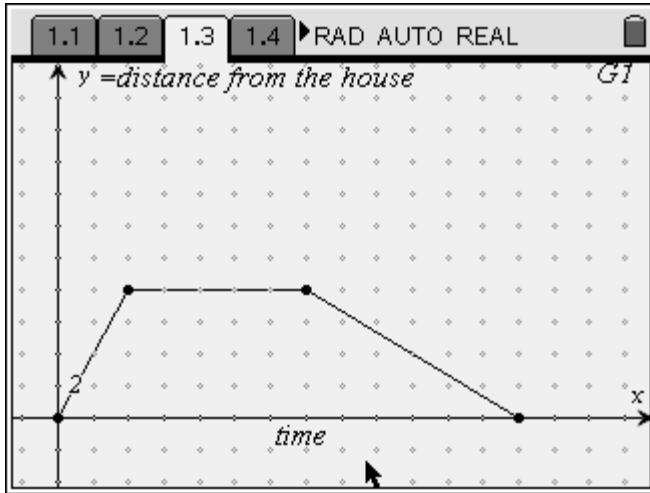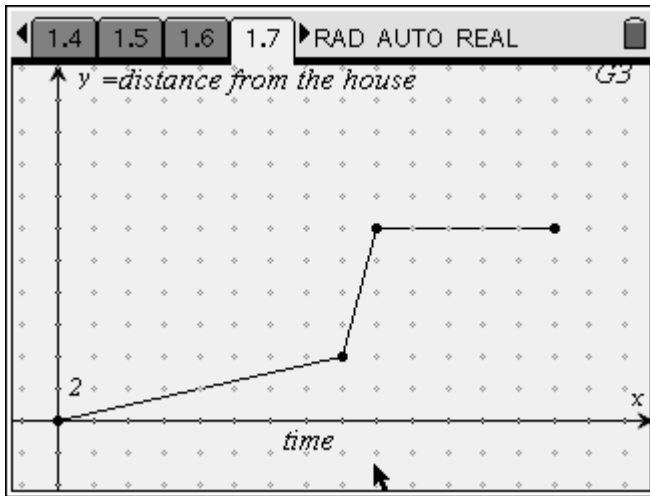
G1	STORY 1

G2	STORY 2

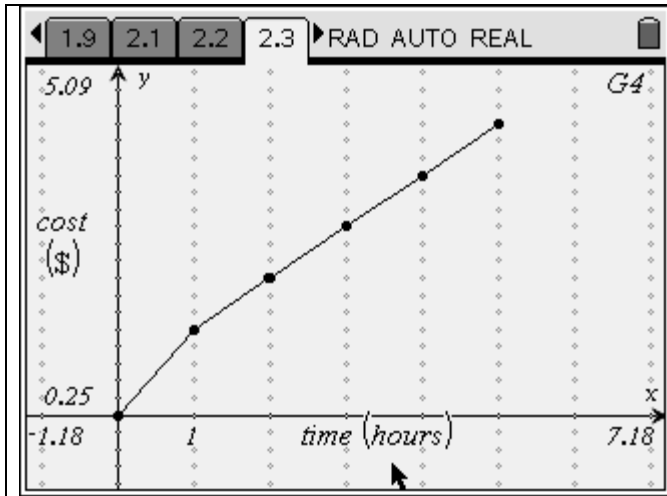| G3	STORY 3
1.4 1.5 1.6 1.7 ▶RAD AUTO REAL y =distance from the house *G3* 2 time	

2. For each graph and its story, indicate the units of measurement of the variables, as well as the domain and range of the function.

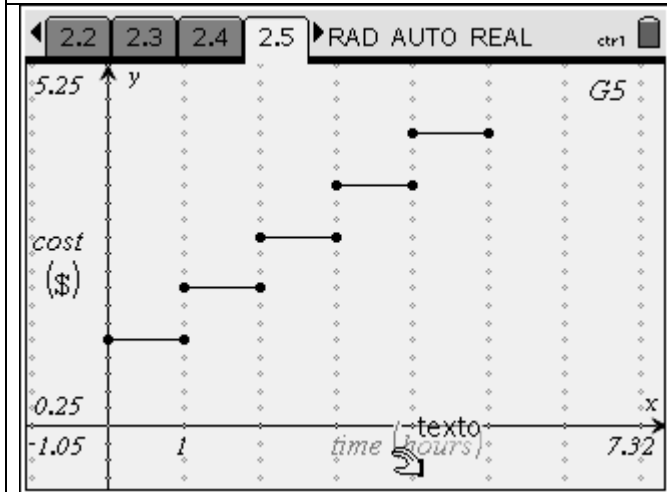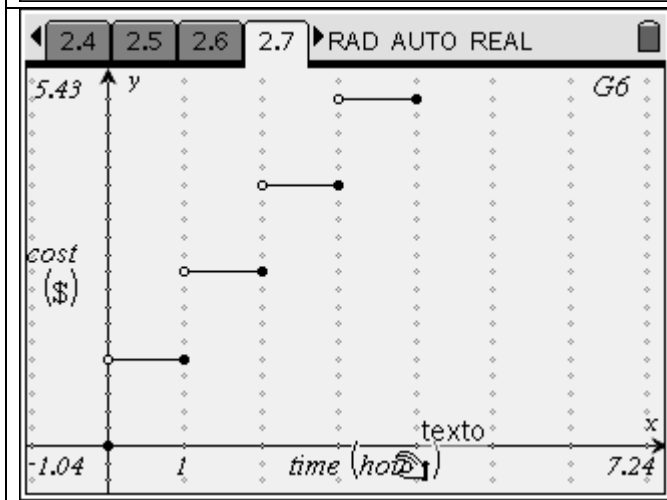|	Units of measurement	Scale	Domain	Range
Story #1				
Story #2				
Story #3				

Problem #2

1. A parking lot in Fort Lauderdale charges $1.25 for the first hour and $0.75 for each additional hour or fraction of an hour. Determine whether the following graphs appropriately illustrate the situation.

2. .

	Yes/No. Why?
1.9 2.1 2.2 2.3 ▶RAD AUTO REAL 5.09 ↑y G4 cost ($) -0.25 -1.18 1 time (hours) 7.18 x	
2.2 2.3 2.4 2.5 ▶RAD AUTO REAL ctrl 5.25 ↑y G5 cost ($) -0.25 -1.05 1 texto time (hours) 7.32 x	Yes/No. Why?
2.4 2.5 2.6 2.7 ▶RAD AUTO REAL 5.43 ↑y G6 cost ($) -1.04 1 time (hours) 7.24 texto x	Yes/No. Why?
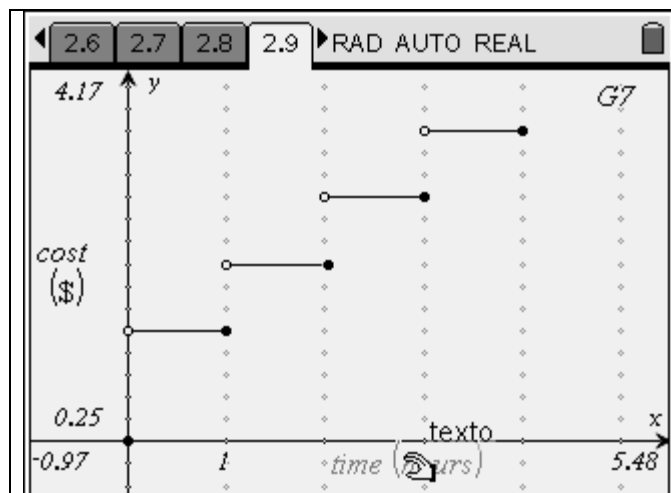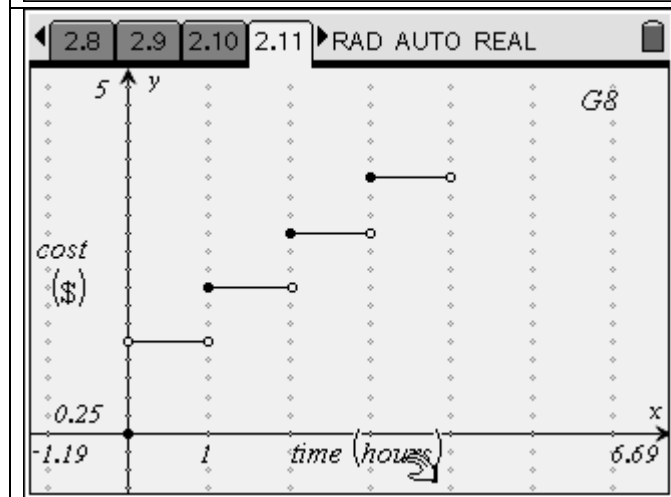
	Yes/No. Why?
2.6 2.7 2.8 2.9 ▶RAD AUTO REAL 4.17 ↑ y G7 cost ($) 0.25 x texto -0.97 1 time (hours) 5.48	
2.8 2.9 2.10 2.11 ▶RAD AUTO REAL 5 ↑ y G8 cost ($) 0.25 x -1.19 1 time (hours) 6.69	Yes/No. Why?

3. Fill out the following table.

Time (in hours)	Cost (in dollars)
0	
0.5	
1	
1.5	
2	
2.5	
3	

4. Use the ceiling function to give an algebraic representation of the function.