**Unit 5: Functions**

**Lesson 5: Step Functions+ Peicewise functions**

**Objectives:**

* I can graph step functions
* I can identify the different features in a step function graph
* I can write a piecewise function for a real life application.

**Agenda:**

* Warm up {Critical thinking}
* Video/ notes { website}
* Practice { individually and together}
* Homework: 5-4 work sheet.

**Focus Questions:**

* How can we graph a step function?
* How do we write a function for a real life application?
* How restricted domains are relate to piecewise function?

Homework 5-5

**Vocabulary:** Definitions

Step Function, Piecewise functions

 **Warm up**

1. Let *f* be a function such that *f*(*x*)= 3*x* − 2 is defined on **the domain** 1 ≤ *x* ≤ 9. Sketch the functions first then find for the range based on the specific domain;
2. 9 ≤ *f*(*x*) ≤ 25 3. −∞ ≤ *f*(*x*) ≤ ∞
3. 1 ≤ *f*(*x*) ≤ 9 4. 1 ≤ *f*(*x*) ≤ 25
4. An electrician works at a job site at a rate of $40 per hour or any portion of an hour. In other words, he will charge you $40 as soon as he comes up to the first hour, and then $40 for the second hour……



1. Graph the amount the electrician charges, *c*, in dollars as a function of the number of hours he works.
2. How much does he charge for working 3.5 hours? Circle the point on the graph.

** Step functions:**  A function that increases or decreases abruptly from one constant value to another.

**1**) When Kimchi is made, it is initially fermented for the first 3 days at a temperature of 70 degree Fahrenheit and then immediately moved to a temperature of 50 degrees Fahrenheit for another 3 days after which it is put in a 35degree refrigerator for 6 days. The Fahrenheit temperature, F, of the kimchi can be modeled over time, t, in days with the question below. Graph the Kimchi’s temperature on the grid provided.



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2.A. Graph the following step function



b. State the Domain and range of this function.

Evaluate f(3) ;

**** **Piecewise function** is defined by more than one condition for specific intervals in its domain. Absolute value functions are specific piecewise functions

[**https://www.youtube.com/watch?v=qLzwPWEpmMg**](https://www.youtube.com/watch?v=qLzwPWEpmMg)

1. Consider the following relationship given by the function.



$$F\left(x\right)=\left\{ 2x+5\begin{array}{c}X+2 If x<0\\ IF 0\leq x\leq 2\\-x+1 IF x>2\end{array}\right.$$

1. Your turn:

$$f\left(x\right)=\left\{\begin{array}{c}3-2x If -1\leq x\leq 1\\2x-1 If x>2\end{array}\right.$$

**Practice: Together:**

1.The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by *w*(*x*), where *x* is the number of hours worked.



1. Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.
2. Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

2) Graph the function: must provide two separate tables.

$$f\left(x\right)=\left\{\begin{array}{c}2x+4 -4\leq x\leq 2\\-6-x x<3\end{array}\right.$$

**Critical thinking:**

Is it possible to graph an absolute value function as piecewise functions? If so, explain the process or show an example.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

5-5: Step and piecewise functions.

1)Let f be a function such that f(x)= y = 3x − 2 is defined on the domain -2 ≤ x ≤ 4. The range of this function is

-8≤ f(x) ≤ 10 −∞ ≤ f(x) ≤ ∞ -2≤ f(x) ≤ 4 4 ≤ f(x) ≤ -8

2)



1. Write a step function for this graph.



1. A store charges $15 per t-shirt for orders of 50 or fewer T-shirts, $13.50 per t-shirt for orders of 75 or fewer but more than 50 t-shirts, and $12.50 per t-shirt for orders of more than 75 t-shirts. Write and graph a function where *C* is the cost of the t-shirts, and *t* is the number of t-shirt.