**Piecewise Functions**

***Recall: Evaluating Functions***

1. Given $f\left(x\right)=x^{2}-4$, find $f\left(-2\right):$ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Given $g\left(x\right)=\frac{x-7}{4}$, find $g\left(-17\right):$ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Given $h\left(x\right)=x^{2}+4x-9$ find $h(-1)$: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_

***Piecewise Functions***

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a function with different equations with different given domains.

***Evaluating Piecewise Functions***

* To evaluate a piecewise function, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the value of x into the “piece” of the function in which x fits in the domain

$$f\left(x\right)=\left\{\begin{array}{c}x+2   if x\geq 2\\2x        if x<2\end{array}\right.$$

Find $f(5):$

Where does 5 fit? $x\geq 2$ or $x<2$

f(5) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_

Find $f(-3):$

Where does $-3$ fit? $x\geq 2$ or $x<2$

f($-3$) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_

$Given f\left(x\right), find the value of  2f\left(5\right)-\frac{1}{2}f \left(-3\right)$ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

$$h\left(x\right)=\left\{\begin{matrix}3x+2&if&x<-2\\2x&if&-2\leq x\leq 3\\-2x+6&if&x>3\end{matrix}\right.$$

Find $h\left(2\right):$

Where does 2 fit?

$x<-2$ or $-2\leq x\leq 3$ or $x>3$

h(2) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_

Find $h(-3):$

Where does $-3$ fit?

$x<-2$ or $-2\leq x\leq 3$ or $x>3$

h($-3$) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_

$Given h\left(x\right), find the value of h(2)-h\left(-3\right).$\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A cell phone company charges customers a monthly fee based on the number of minutes, x, they use each month. This is represented by the piecewise function below.

$$\left\{\begin{array}{c}30+.05x,     0\leq x<500\\40+.03x,     500\leq x<1,000\\60,     x\geq 1,000\end{array}\right.$$

1. If a customer used 400 minutes, what was their monthly bill?
2. If a customer used 900 minutes what would be their cost?
3. What is a better deal, talking 999 minutes or 1,000 minutes?

***Graphs of Piecewise Functions***

* The graph of a piecewise function can either be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or not continuous
	+ If you can move your pencil across the graph without picking it up, the function is continuous
		- ******Decide whether or not each graph below is continuous or not continuous:

Continuous Continuous Continuous

 Not Continuous Not Continuous Not Continuous

***Step Functions***

* A common type of piecewise functions is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ function. The step function has all constant pieces. Step functions are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ Step functions are commonly used when calculating things like cell phone bills, taxi rides, parking deck costs, etc.

**Use the graph of the step function to the right to answer the questions below:**

1. How much would it cost to ship a package weighing 4 ounces? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What would be the cost of shipping a package weighing 0.8 ounces? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What would be the total cost of shipping both a 5-ounce package and a 3.4-ounce package? \_\_\_\_\_\_\_\_\_\_