The first two pages are guided notes.
The second two pages are the assignment (independent practice).
My student teacher, Ryley Blomberg, did the first draft of the assignment and the other algebra one teachers at our school gave feedback to improve it.

I will post the answers later but wanted to get this out to everyone now.

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Algebra I notes date: _____

Piecewise Functions

A **piecewise function** is defined by two or more rules. To decide the rule you need to use, determine which inequality describes each input value, and then use the corresponding rule.

Example 1 Evaluate the piecewise function, $p(x)$, for different input values:

$$p(x) = \begin{cases} 2x & \text{if } x < 0 \\ x + 5 & \text{if } x = 0 \\ 0.5x - 1 & \text{if } x > 0 \end{cases}$$

$p(10) =$ _____ $p(-10) =$ ____ $p(0) =$ _____ $p(2.48) =$ ____

What input value will give an output of -6? Symbolically, $p(\,?\,) = -6\,?$

Example 2 Complete the table for the following piecewise function:

$$f(x) = \begin{cases} 2x + 1 \text{ for } x < 2 \\ x^2 - 2 \text{ for } x \geq 2 \end{cases}$$

x	-3	-2	-1	0	1	1.5	2	$\sqrt{5}$	3
$f(x)$									

Which piece of $f(x)$ is not linear? _____

Example 3 Consider the following scenario:

Bralen wants to join a gym. If he joins for seven months or less, it will cost him an initiation fee of $40 plus $12 per month (including the first month). If he joins for more than seven months, it will cost him $130 for the whole year. If $x =$ months, complete the table to show how much Bralen can expect to pay depending on the number of months he plans to work out.

x	1	2	3	4	5	6	7	8	9	10	11	12
$g(x)$												

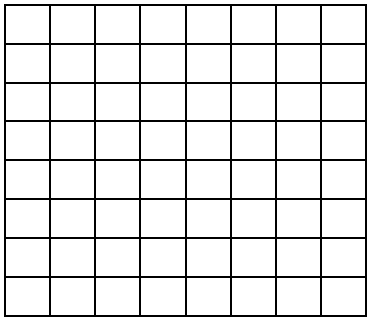
Can you write the piecewise equation for $g(x)$? $g(x) = \{$ _____

Example 4 Graph the piecewise function $a(x) = \begin{cases} -x, & x \leq 0 \\ x, & x > 0 \end{cases}$

First make a table of values… include at least one fraction and one decimal input value.

x								
$a(x)$								

Now plot the points to make the graph! HINT: Draw your axes based on your points.



This function has a name which is "the absolute value function" because just one rule can describe it. That rule is $a(x) = |x|$. This function is EVEN because it has symmetry with the y-axis.

Example 5 Timmy's T-Shirt Place has different prices depending on how many t-shirts you order.

The piecewise function $T(x) = \begin{cases} 9.00x, & 0 \leq x < 20 \\ 8.00x + 3, & 20 \leq x < 40 \\ 7.00x + 3, & x \geq 40 \end{cases}$

How much will an order of 25 t-shirts cost? $T(25) =$ _____

How much will an order of 125 t-shirts cost? $T(125) =$ _____

What is the price per shirt for an order of 10 t-shirts? _____

If the bill was \$171, how many t-shirts were ordered? (there are two answers!) _____ and _____

PIECE OUT! HAHA!

Algebra I Assignment Name: _____

Piecewise Functions

1) Evaluate the piecewise function, $g(x)$, for different input values:

$$g(x) = \begin{cases} 5x & \text{if } x < 0 \\ 2x + 1 & \text{if } x = 0 \\ 3x - 1 & \text{if } x > 0 \end{cases}$$

$g(7) =$ _____ $g(-7) =$ ____ $g(0) =$ _____ $g(1.73) =$ ____

What input value will give an output of 14? Symbolically, $p(\ ?\ ) = 14$?

2) Complete the table for the following piecewise function:

$$f(x) = \begin{cases} 6x + 7 \text{ for } x < 0 \\ 2x^2 - 4 \text{ for } x \geq 0 \end{cases}$$

x	-3	-2	-1	0	1	1.5	$\sqrt{3}$	$\sqrt{5}$	3
$f(x)$									

3) Consider the following scenario:

Logan wants to join a readers' club at the public library. If he joins to read 5 books or less, it will cost him a initial fee of \$12 plus \$6 per book (including the first book). If he joins to read more than 5 books, he will get a library card for \$84 for a full year of unlimited books.
If $x =$ number of books, complete the table to show how much Logan can expect to pay depending on the number of books he plans to read.

x	1	2	3	4	5	6	7	8	9	10	11	12
$g(x)$												

Can you write the piecewise equation for $g(x)$? $g(x) = \{$ _____
_____

How many books does Logan need to read in order for a library card to be the better deal?

4) Evaluate the piecewise function, $p(x)$, for different input values:

$$p(x) = \begin{cases} 5x + 2 & \text{if } x < 0 \text{ or } x > 2 \\ 2x^2 & \text{if } 0 \le x < 2 \\ -3x & \text{if } x = 2 \end{cases}$$

$p(-3) =$ _____ $p(1) =$ ____ $p(0) =$ _____ $p(2) =$ ____ $p(7) =$ ____ $p\left(\frac{1}{2}\right) =$ ____

5) The Lafayette High School Athletics Department has different ticket packages depending on how many sporting events you plan to attend.

The piecewise function $A(x) = \begin{cases} 5.00x, & 0 \le x < 8 \\ 2.50x + 5, & 8 \le x < 20 \\ 1.00x + 5, & x \ge 20 \end{cases}$

How much will it cost someone if they go to 10 games? $T(10) =$ _____
How much will it be if someone goes to just the 6 football games? $T(6) =$ _____
How much will it be if someone goes to 30 games? $T(\quad) =$ _____
If Dr. Kitchens pays $50 for his ticket package, how many games did he go to?

6) Graph the piecewise function.
First, complete the table of values before you plot the points.

$$f(x) = \begin{cases} \frac{2}{3}x - 4 & x \le -2 \text{ or } x > 5 \\ 3 - x & -2 < x < 5 \\ -x & x = 5 \end{cases}$$

x	-6	-3	-2	-1	0	1	2	3	4	5	6	7
$f(x)$