Piecewise Functions

Name_______________________
Date: ________________ Block:____
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Warm – Up→

1. Evaluate the function for the indicated values \( f(x) = 3x – 2 \)
   a. \( f(2) = \)
   b. \( f(0) = \)
   c. \( f(-2) = \)

2. Graph the two linear equations on the same x-y plane below
   \[ y = -x - 4 \]
   \[ y = 2x + 1 \]

Notes→ Piecewise Functions

If we want a function to behave differently depending on the x-values, we need a piecewise function. A piecewise function is just a function that uses more than one equation to describe its behavior. When we graph piecewise functions, we are really graphing different pieces of different lines.
Example One: Evaluating a piecewise function

\[ f(x) = \begin{cases} 
2x - 5, & x < 2 \\
\frac{1}{3}x + 1, & x \geq 2
\end{cases} \]

a) \( f(1) \)  

b) \( f(2) \)  

c) \( f(3) \)

Example Two: Graphing a piecewise function using a table of values

\[ f(x) = \begin{cases} 
x^2, & x < -4 \\
-x + 2, & x \geq -4
\end{cases} \]

a) \( f(-6) \)  

b) \( f(-4) \)  

c) \( f(-2) \)

Example Two: Graphing a piecewise function using a table of values

\[ f(x) = \begin{cases} 
2x - 1, & x \leq 1 \\
-x + 3, & x > 1
\end{cases} \]

Steps:

1) 
2) 
3) 
4)
Example Three \(\rightarrow\) Graphing a piecewise function using a switch point

\[
f(x) = \begin{cases} 
2x - 1, & x \leq 1 \\
-x + 3, & x > 1 
\end{cases}
\]

Steps:

1)
2)
3)
4)

Example Four \(\rightarrow\) Writing a piecewise function
Example Five→ Word Problem

You have a summer job that pays time and a half for overtime. (If you work more than 40 hours) After that it is 1.5 times your hourly rate of $8.00/hr. Write a piecewise function that models your pay schedule and graph the function.

Example Six→ Graph the Step Function

\[ f(x) = \begin{cases} 
1, & -6 \leq x < -3 \\
2, & -3 \leq x < 0 \\
3, & 0 \leq x < 3 \\
4, & 3 \leq x < 6 
\end{cases} \]