EVALUATING & GRAPHING PIECEWISE FUNCTIONS

A piecewise function is a function defined by two or more equations over a specified domain.

Given, $f(x) = \begin{cases} 3x-4, & x<0 \\ 3x+1, & x \geq 0 \end{cases}$ If evaluating an x value less than 0, plug it into 3x-4, if evaluating an x value greater than or equal to zero, plug it into 3x+1.

① Look at the inequality to see where your x fits

② Plug in your x to that piece of the function only

Examples: Use the given functions to find the requested values

Given: $f(x) = \begin{cases} 3x-4, & x<0 \\ 3x+1, & x \geq 0 \end{cases}$ and $g(x) = \begin{cases} x^2+1, & x<2 \\ x-1, & x \geq 2 \end{cases}$

1. a. $f(2)$ $2 \geq 0$ so plug in 2 to 3x+1

$3(2)+1 = 7$

$(2,7)$

b. $f(0)$ $0 \geq 0$ so plug into 3x+1

$3(0)+1 = 1$

c. $g(-6)$ $-6 > 2$ so plug into x^2+1

$(-6)^2+1$

$36+1 = 37$

Graph the following piecewise functions **Make sure to pay close attention as to whether or not the dots should be open or closed!

5. $f(x) = \begin{cases} 2x+3, & x \le 1 \\ -x+4, & x > 1 \end{cases}$ critical pt. draw a dashed line through crit. pt. + don't cross

$y = 2x+3$

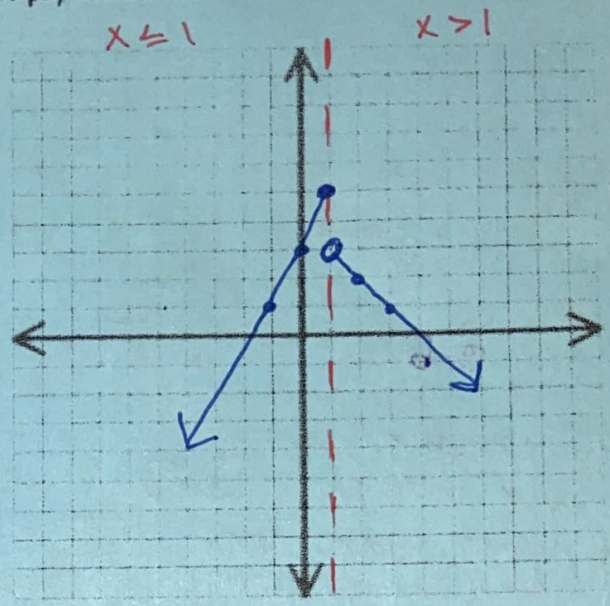
$x \le 1$

x	y
1	5
0	3
-1	1

$y = -x+4$

$x > 1$ open pt so

x	y
1	3
2	2
3	1



6. $g(x) = \begin{cases} -\frac{1}{2}x-6, & x \le -4 \\ x+5, & x > -4 \end{cases}$

$y = -\frac{1}{2}x - 6$

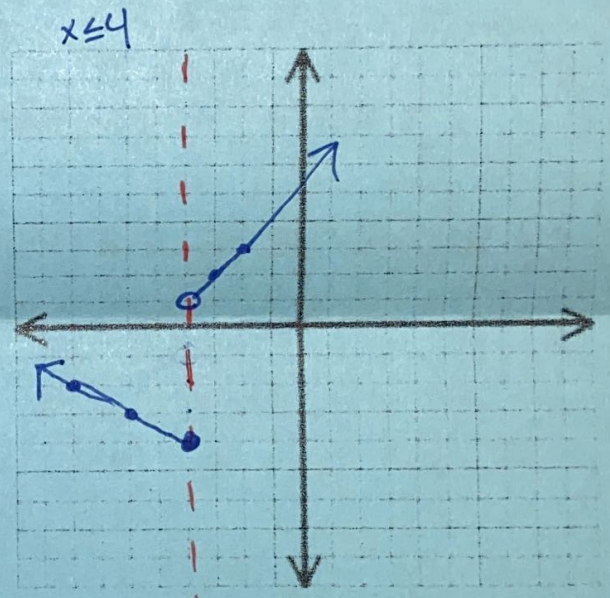
closed pt.

x	y
-4	-4
-6	-3
-8	-2

$y = x+5$

open pt

x	y
-4	1
-3	2
-2	3



7. $h(x) = \begin{cases} x^2, & x \le 0 \\ 3, & 0 < x \le 2 \\ 2x-1, & x > 2 \end{cases}$

$x \le 0$

$y = x^2$

x	y
0	0
-1	1
-2	4
-3	9

$0 < x \le 2$

$y = 3$

x	y
0	3
1	3
2	3

$x > 2$

$y = 2x-1$

x	y
2	3
3	5
4	7