5TH Hour

Piecewise Functions

Piecewise Function: It is not a linear function because each interval, or piece, of the function is defined by a different expression. This is what you call a function that is written using two or more different expressions.

Things to remember:

Open circle means not a solution $>$ OR $<$

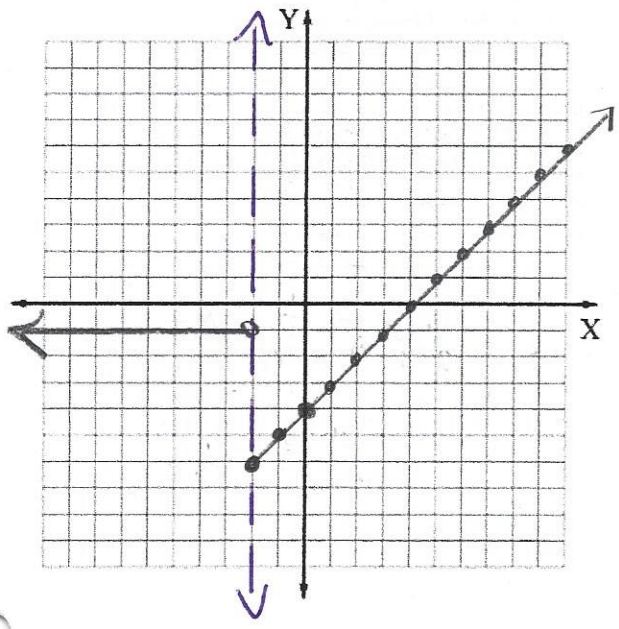
Closed circle means it is a solution $\geq, \leq$, OR $=$

Steps to graphing a piecewise function:

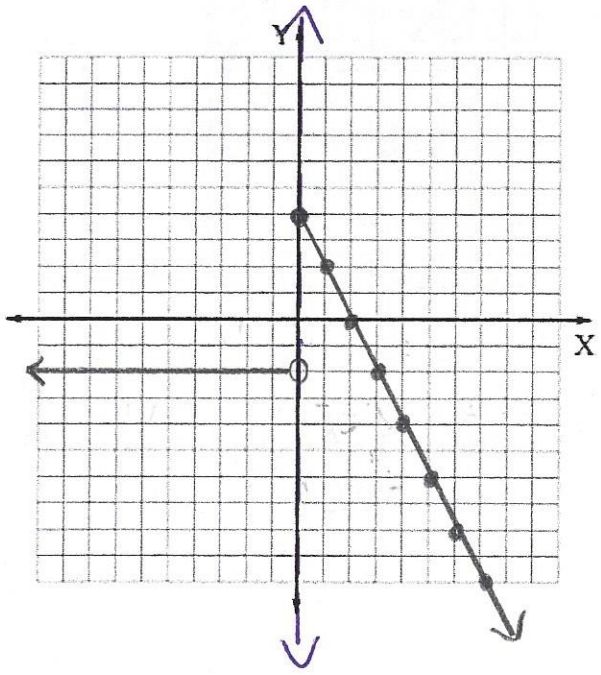
1. Start by graphing the boundary line or wall. This is a vertical line
2. Work backward from the y-intercept to the boundary to start plotting the first line.
   a. Remember to check if the circle is open or closed
3. Graph the next line or lines in the same manner.

Graph.

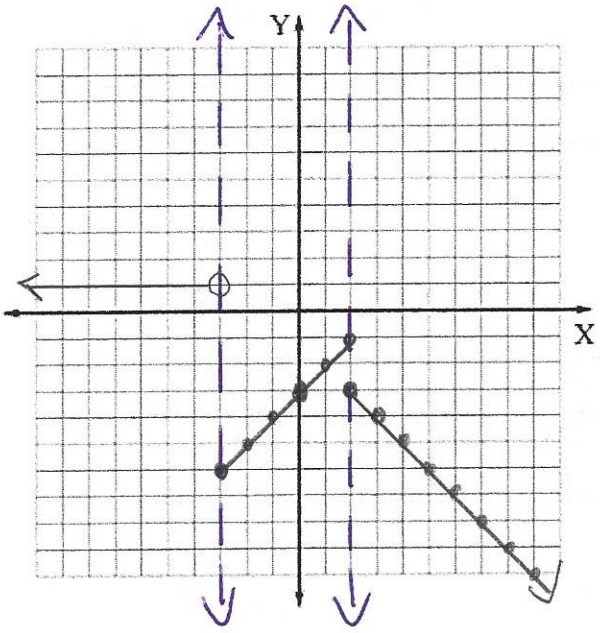
$$f(x) = \begin{cases} -1, & x \leq -2 \\ x - 4, & x \geq -2 \end{cases}$$



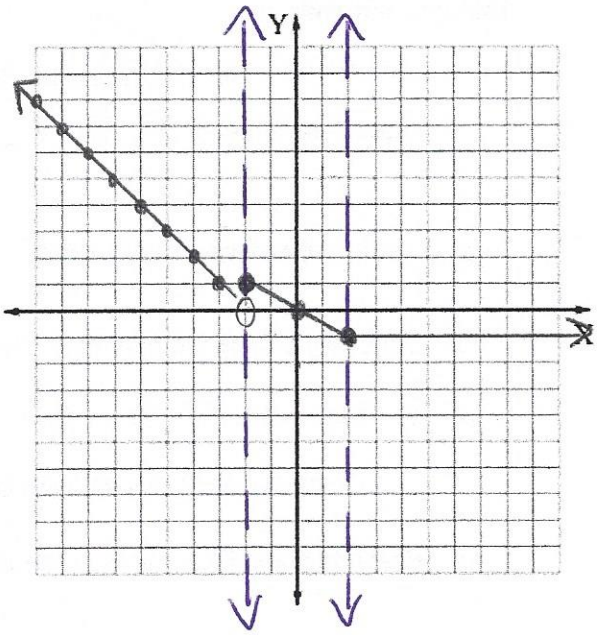
$$f(x) = \begin{cases} -2, & x < 0 \\ -2x + 4, & x \geq 0 \end{cases}$$



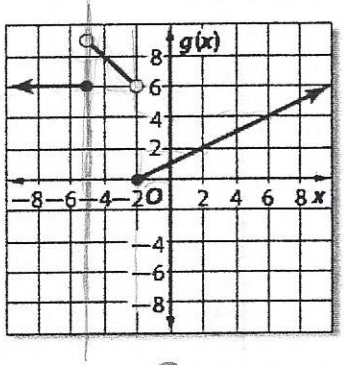
$$f(x) = \begin{cases} 1, & x < -3 \\ x - 3, & -3 \le x \le 2 \\ -x - 1, & x \ge 2 \end{cases}$$



$$f(x) = \begin{cases} -x - 2, & x < -2 \\ -\frac{1}{2}x, & -2 \le x \le 2 \\ -1, & x > 2 \end{cases}$$

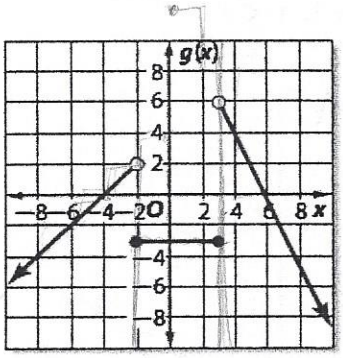


Write the piecewise function for each graph.



$y = mx + b$

$$f(x) = \begin{cases} 6 \; ; \; x \le -5 \\ -x + 4 \; ; \; -5 < x \le -2 \\ \frac{1}{2}x + 1 \; ; \; x \ge -2 \end{cases}$$



$$f(x) = \begin{cases} x + 4 \; ; \; x < -2 \\ -3 \; ; \; -2 \le x \le 3 \\ -2x + 12 \; ; \; x > 3 \end{cases}$$