Integrated Math 3
Unit 3: Representing Functions
3.8

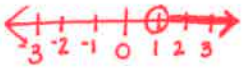
Name: _____

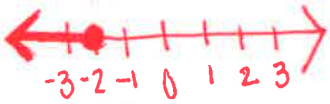
Date:_____ Period:_____

Objective: Graphing piecewise functions

Warm-up: Graph the following linear inequalities on a number line

a) $x \geq 4$ b) $x > 1$ c) $x < 0$ d) $x \leq -2$





How to graph piecewise functions:

Tips:

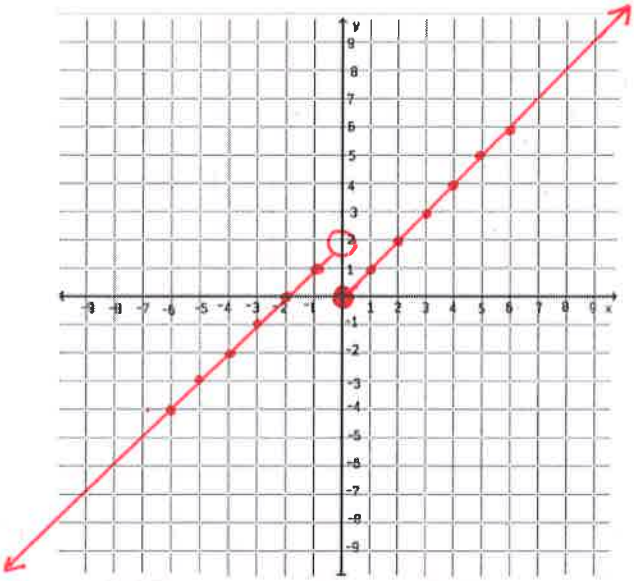
- Create a t-chart for each equation included in the function
- Make sure each value of the restricted domain is included in the t-chart
- Decide whether to use an "open" or "closed" circle based on the restricted domain

Example:

$$f(x) = \begin{cases} x + 2 \text{ if } x < 0 \\ x \text{ if } x \geq 0 \end{cases}$$

open	x+2
0	2
-1	1
-2	0
-3	-1
-4	-2
-5	-3
-6	-4

closed	x
0	0
1	1
2	2
3	3
4	4
5	5
6	6



Practice: Graph the following piecewise functions.

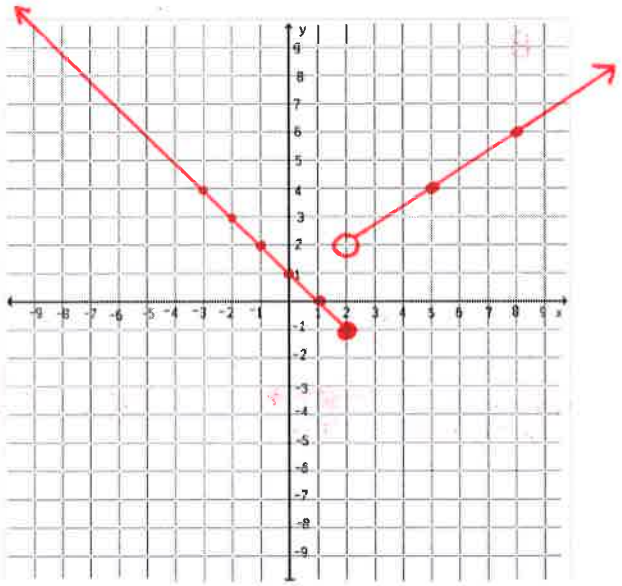
a. $f(x) = \begin{cases} \frac{2}{3}x + \frac{2}{3} \text{ if } x > 2 \\ -x + 1 \text{ if } x \leq 2 \end{cases}$

$\frac{2}{3}x + \frac{2}{3}$

open 2	2
3	8/3
4	10/3
5	4
6	14/3
7	16/3
8	6

$-x+1$

closed 2	-1
1	0
0	1
-1	2
-2	3
-3	4



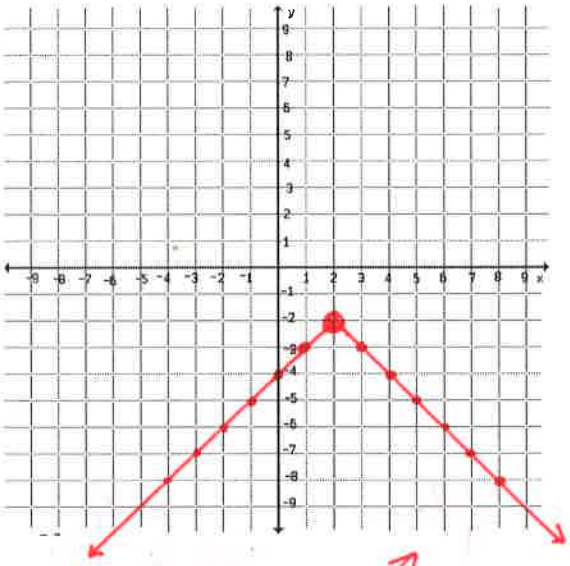
b. $f(x) = \begin{cases} -x \text{ if } x > 2 \\ x - 4 \text{ if } x \leq 2 \end{cases}$

$-x$

open 2	-2
3	-3
4	-4
5	-5
6	-6
7	-7
8	-8

$x-4$

closed 2	-2
1	-3
0	-4
-1	-5
-2	-6
-3	-7
-4	-8



c. $f(x) = \begin{cases} x + 4 \text{ if } x < -2 \\ 4 \text{ if } x = -2 \\ x + 6 \text{ if } x > -2 \end{cases}$

$x+4$

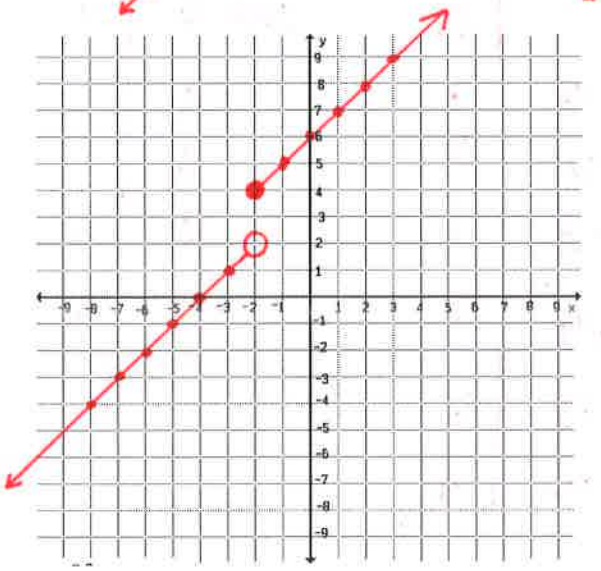
open -2	2
-3	1
-4	0
-5	-1
-6	-2
-7	-3
-8	-4

4

closed -2	4

$x+6$

open -2	4
-1	5
0	6
1	7
2	8
3	9
4	10



d. $f(x) = \begin{cases} 4 \text{ if } 0 \le x < 2 \\ 5 \text{ if } 2 \le x < 4 \\ 6 \text{ if } 4 \le x < 6 \end{cases}$

★ this is a step function.

	4
closed	0
	1
open	2

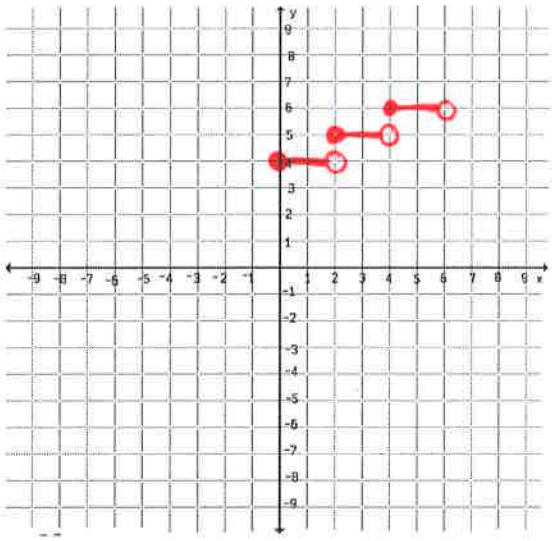
	4
	4
	4

	5
closed	2
	3
open	4

	5
	5
	5

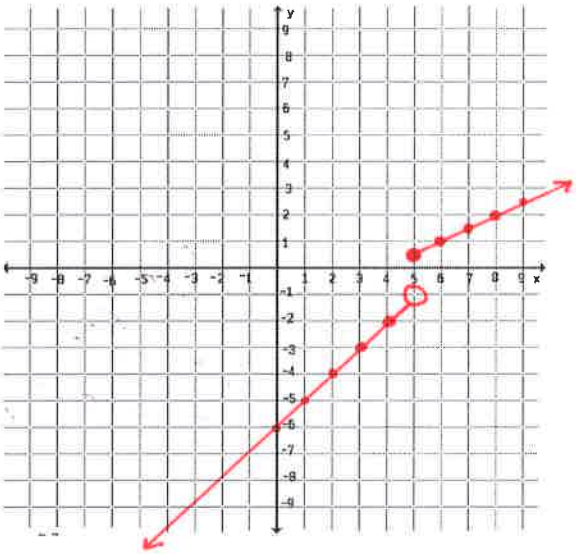
	6
closed	4
	5
open	6

	6
	6
	6



Putting it all together!

Given the function $f(x) = \begin{cases} x - 6 \text{ if } x < 5 \\ \frac{1}{2}x - 2 \text{ if } x \ge 5 \end{cases}$



a) Evaluate $f(2)$ = $(2) - 6 = -4$

b) Evaluate $f(5)$ = $\frac{1}{2}(5) - 2 = \frac{1}{2}$

c) Evaluate $f(8)$ = $\frac{1}{2}(8) - 2 = 2$

d) Graph the function!

	$x-6$
open	5
	4
	3
	2
	1
	0

	$x-6$
	-1
	-2
	-3
	-4
	-5
	-6

	$\frac{1}{2}x-2$
closed	5
	6
	7
	8
	9
	10

	$\frac{1}{2}x-2$
	$\frac{1}{2}$
	1
	$3/2$
	2
	$5/2$
	3