

Piecewise Functions

#1-4 Graph the piecewise functions. List the Domain and the Range of the function.

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

2nd math
open dot + closed dot = closed

$f(x) = x^2 + 4, x < 0$

x	f(x)
-2	8
-1	5
0	4

open

$f(x) = \sqrt{x} + 4, x \geq 0$

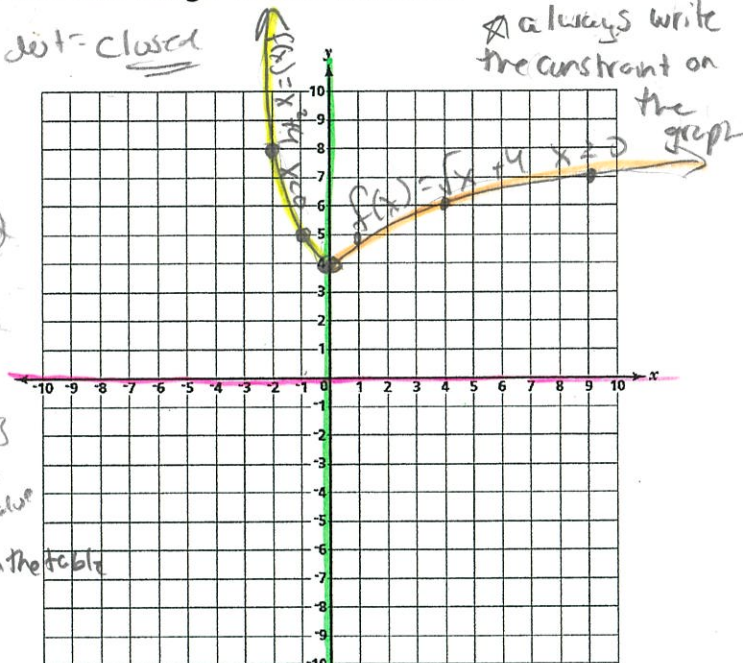
x	f(x)
0	4
1	5
4	6
9	7

closed
copy whole #'s
Integers only for y-value

Constraint values must be 1st or last # in the table

Domain: all reals or $\{x | x \in \mathbb{R}\}$ or $(-\infty, \infty)$

Range: $\{y | y \geq 4\}$ or $[4, \infty)$



Continuous graph B/c you don't have to lift up your pencil to trace it.
No Breaks/Jumps on the graph

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

$f(x) = |x| - 1, x > -1$

x	f(x)
-1	0
0	-1
1	0
2	1
3	2
4	3
5	4

open

$f(x) = x + 3, x \leq -1$

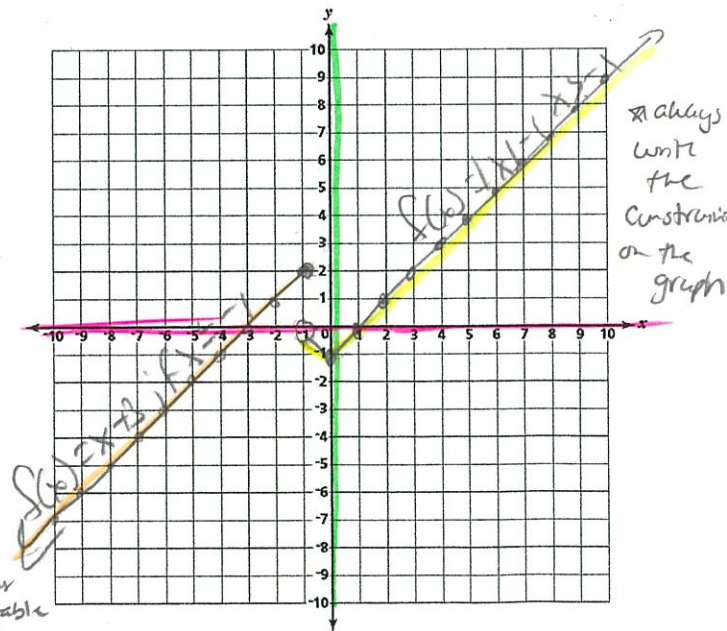
$m = 1$
 $B = 3$

closed

Constraint values must be 1st or last # in your table

Domain: all reals or $\{x | x \in \mathbb{R}\}$ or $(-\infty, \infty)$

Range: all reals or $\{y | y \in \mathbb{R}\}$ or $(-\infty, \infty)$



Discontinuous graph B/c you have to lift up your pencil to trace it.
The graph has a Break/Jump

always write the constraints on the graph

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

$$f(x) = -x+1, \quad x < -4$$

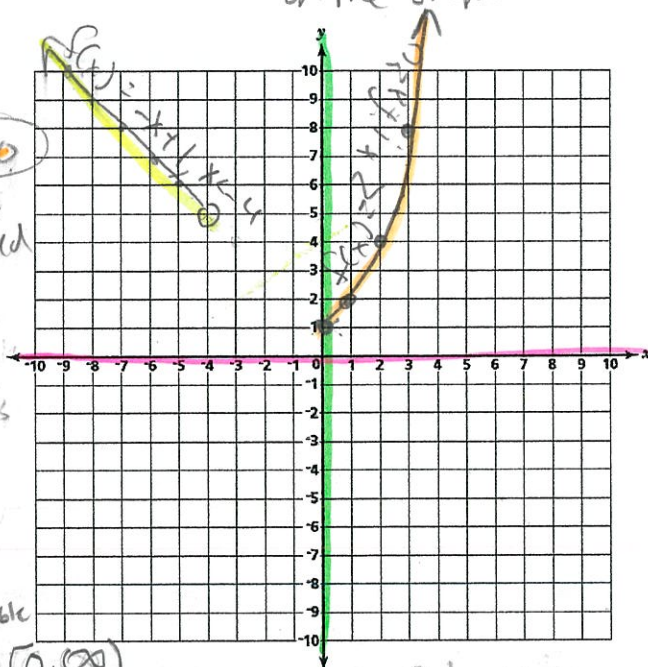
$m = -1$
 $B = 1$

open

$$f(x) = 2^x, \quad x \geq 0$$

x	f(x)
0	1
1	2
2	4
3	8

closed



Constraint values must be 1st or last # in the table

Domain: $\{x \mid x < -4 \text{ OR } x \geq 0\}$ or $(-\infty, -4) \cup [0, \infty)$

Range: $\{y \mid y \geq 1\}$ or $[1, \infty)$

Discontinuous B/c you have to lift up your pencil to trace it

The graph has a break/jump

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

in calc $(-2 < x) (x < 2)$ must put in separate!

$$f(x) = 4, \quad x \leq -2$$

$m = 0$
 $B = 4$

closed

$$f(x) = x^2, \quad -2 < x < 2$$

x	f(x)
-2	4
-1	1
0	0
1	1
2	4

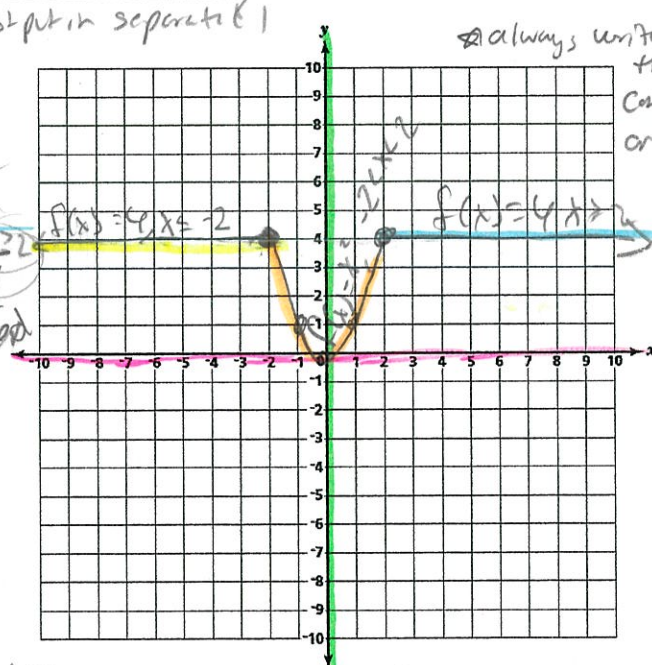
open

$$f(x) = 4, \quad x \geq 2$$

$m = 0$
 $B = 4$

closed

always write the constraints on the graph



Constraint values must be 1st or last # in the table

Domain: all real or $\{x \mid x \in \mathbb{R}\}$ or $(-\infty, \infty)$

Range: $\{y \mid 0 \leq y \leq 4\}$ or $[0, 4]$

Continuous B/c you don't have to lift up your pencil to trace it

No Breaks/jumps on the graph