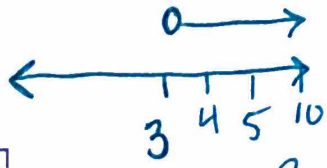
More Challenging Functions & Even/Odd Notes

$(3,\infty)$



$x > 3$

Piece-wise Functions

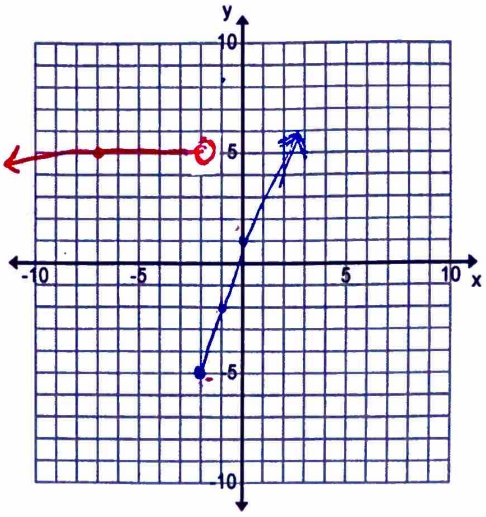
Ex. 1: Graph $f(x) = \begin{cases} 5, & x < -2 \\ 3x+1 & x \geq -2 \end{cases}$

$y = 5 \quad (-\infty, -2)$

x	y
$-\infty$	5
-7	5
-2	5

$y = 3x+1 \quad [-2, \infty)$

x	y
-2	-5
5	16



Ex. 2: Graph $f(x) = \begin{cases} x^2+1 & x < -2 \\ -2x & -2 \leq x \leq 3 \\ 4 & x > 3 \end{cases}$

$y = x^2+1 \quad (-\infty, -2)$

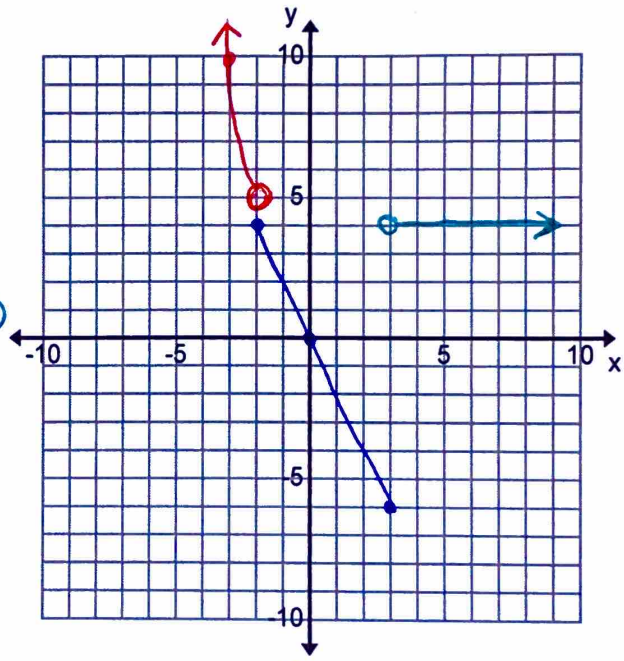
x	y
$-\infty$	
-3	10
-2	5

$y = -2x \quad [-2, 3]$

x	y
-2	4
0	0
3	-6

$y = 4 \quad (3, \infty)$

x	y
3	4
4	4
5	4



Ex. 3: Graph $f(x) = \begin{cases} \sqrt{x+13} & x < -4 \\ 1-(x+2)^2 & x \geq -4 \end{cases}$

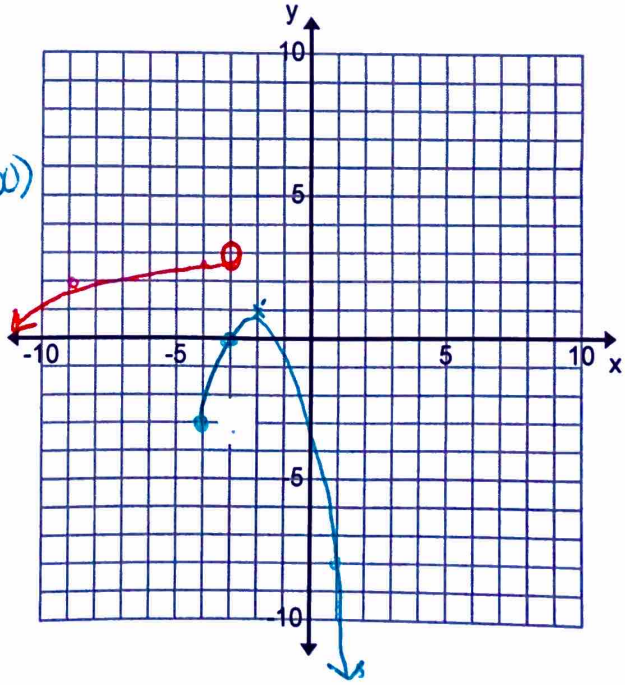
$y = \sqrt{x+13}$

x	y
-9	2
-5	$\sqrt{8} \approx 2.8$
-4	3

$y = 1-(x+2)^2 \quad [-4, \infty)$

x	y
-4	-3
-3	0
1	-8
2	-15
0	

$V: (-2, 1)$



*always $-x$ for x

Even\Odd Functions

Even: (y symmetry)

*plug in $-x$ for x & see if you get to the original

Odd: (origin symmetry)

*plug in $-x$ should get $-f(x)$

→ all signs change

Ex. 4: $g(x) = x^3 - 2x$

$g(x) = (-x)^3 - 2(-x)$

$= (-x)^3 + 2x$

$\boxed{\text{ODD}}$

all signs changed

Ex. 5: $f(x) = x^2 + 9$

$f(x) = (-x)^2 + 9$

$= x^2 + 9$

$\boxed{\text{EVEN}}$

same as original

Ex. 6: $k(x) = x^2 + x$

$k(x) = (-x)^2 + (-x)$

$= x^2 - x$

$\boxed{\text{neither}}$