

## More Challenging Functions & Even/Odd Notes

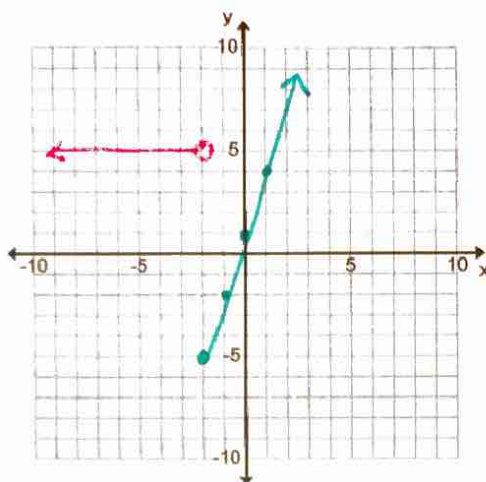
### Piece-wise Functions

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

$$y = 5 \quad x < -2$$

$$y = 3x+1 \quad x \geq -2$$

$$y = 3(-2)+1 = -5$$



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

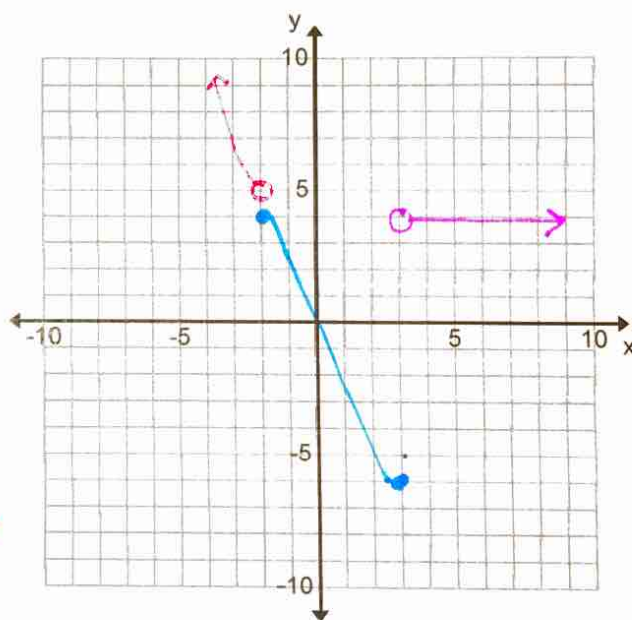
$$y = x^2 + 1 \quad x < -2$$

$$y = (-2)^2 + 1 = 5$$

$$y = -2x \quad -2 \leq x \leq 3$$

$$y = -2(-2) = 4 \quad y = -2(3) = -6$$

$$y = 4 \quad x > 3$$



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

$$y = \sqrt{x+3} \quad x < -4$$

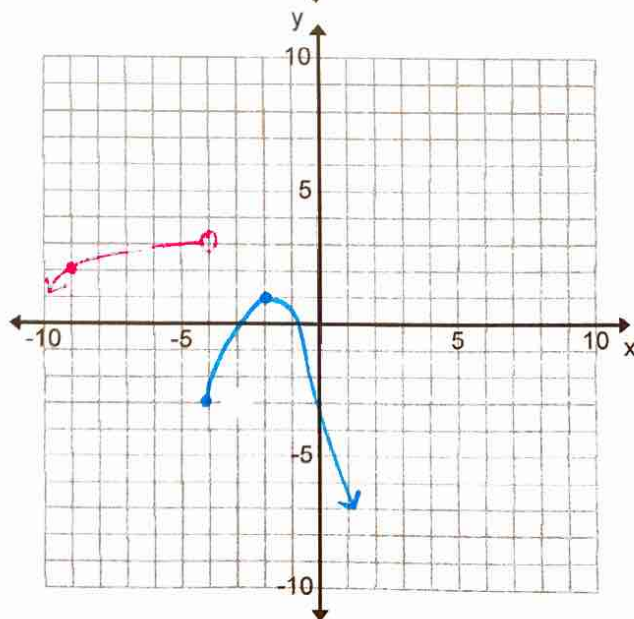
$$y = \sqrt{-4+3} = \sqrt{-1} = 3$$

$$\sqrt{-9+3} = \sqrt{-6} = 2$$

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

$$y = 1 - (-4+2)^2$$

$$y = 1 - (-2)^2 = -3$$



## Even/Odd Functions

Even: plug in  $-x$  ;  
get the original  
→ y-symmetry

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

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

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

**ODD**

Odd: plug in  $-x$  ;  
you get  $-f(x)$   
\*all signs change  
→ origin symmetry

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

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

$$= x^2 + 9$$

**EVEN**

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

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

$$= x^2 - x$$

**neither**