

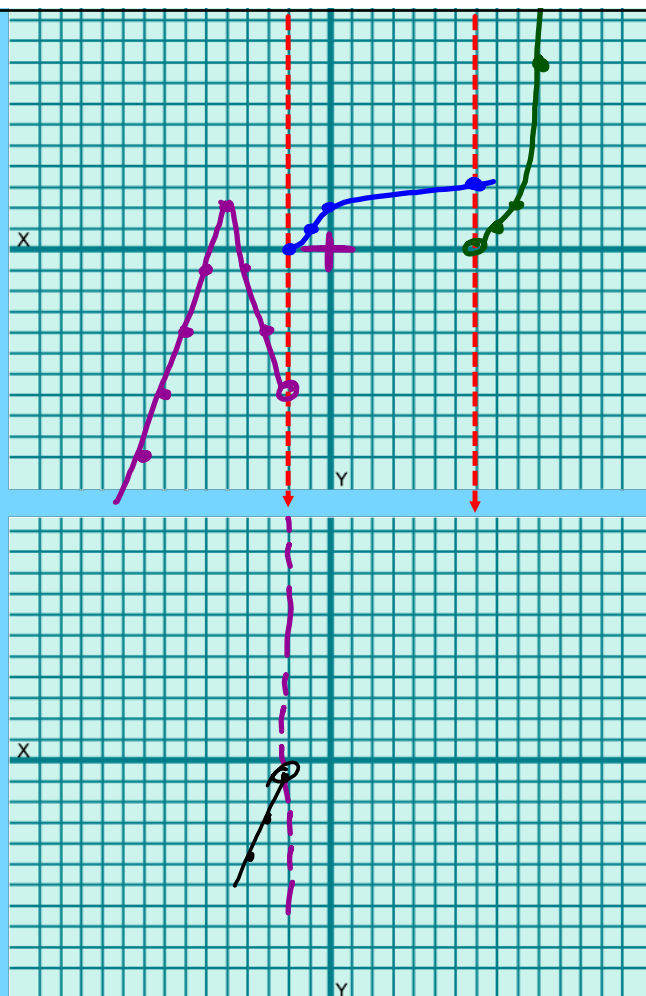
## PIECEWISE FUNCTIONS

$$f(x) = \begin{cases} -3|x+5| + 2 & x < -2 \\ \sqrt[3]{x+1} + 1 & -2 \leq x \leq 7 \\ (x-8)^3 + 1 & x > 7 \end{cases}$$

$$\begin{array}{c|c} 0 & 0 \\ \hline -1 & 2 \end{array}$$

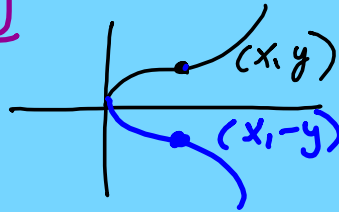
$$\begin{array}{c|c} 0 & 0 \\ \hline -1 & -8 \end{array}$$

$$f(x) \left\{ \begin{array}{l} 2x + 3 \quad x < -2 \end{array} \right.$$

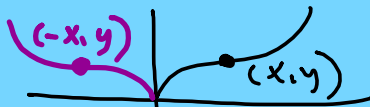


# Symmetry

x-axis  
sub in  $-y$

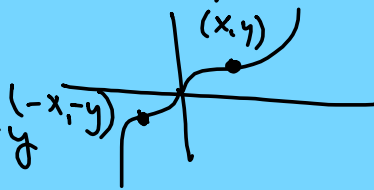


y-axis  
Sub in  $-x$



Origin

Sub in  $-x$  +  $-y$



$$y = 2x^2 + 1 \quad \Psi$$

x-axis <sub>No</sub>  $-y = 2x^2 + 1$

y-axis <sub>yes</sub>  $y = 2(-x)^2 + 1$   
 $y = 2x^2 + 1$

Origin <sub>no</sub>  $-y = 2(-x)^2 + 1$   
 $-y = 2x^2 + 1$

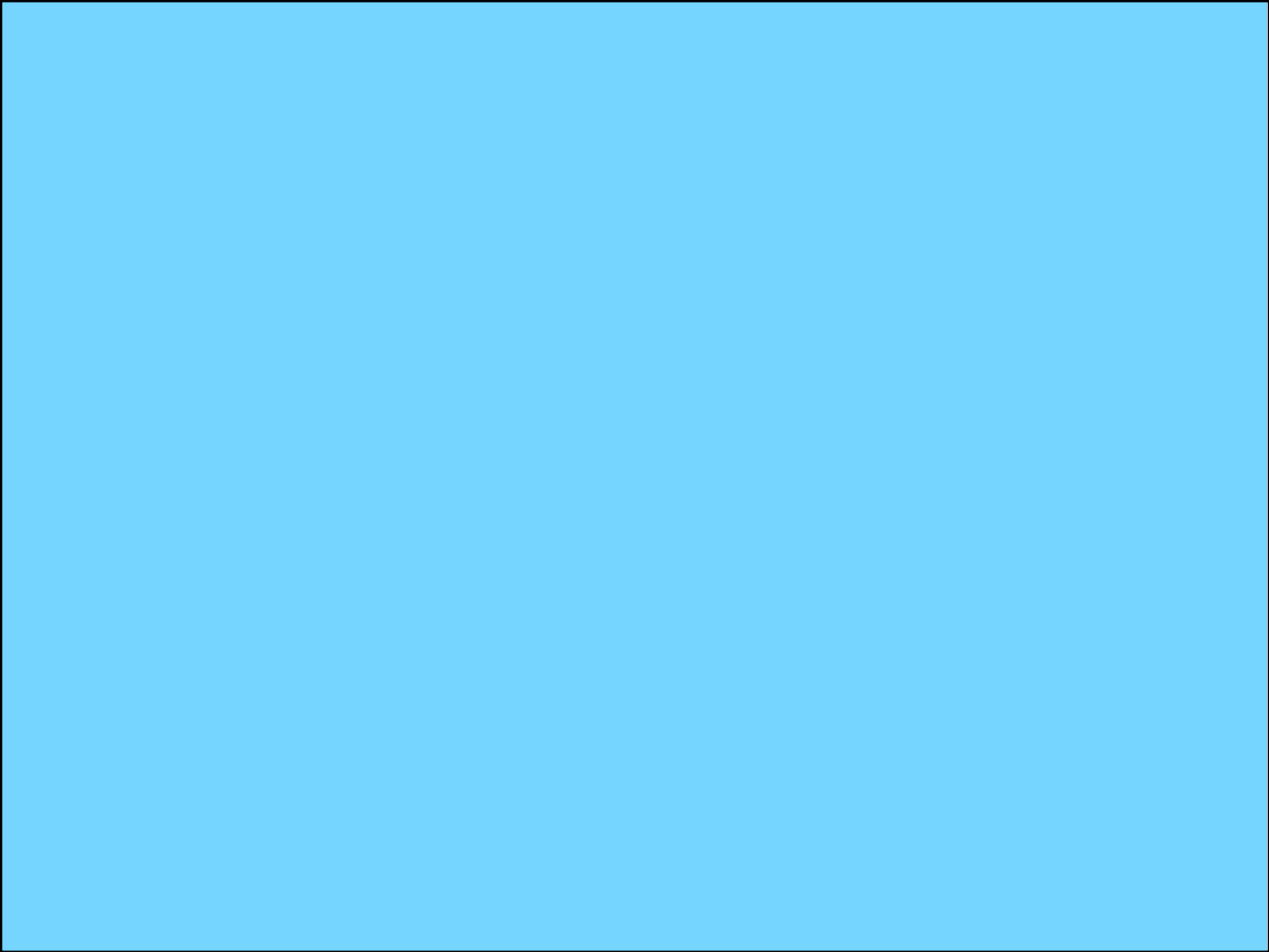
Must get original equation!

$$4xy + 2x^2 = 7$$

x-axis <sub>(-y)</sub>  $4x(-y) + 2x^2 = 7$  **No**  
 $-4xy + 2x^2 = 7$

y-axis <sub>(-x)</sub>  $4(-x)y + 2(-x)^2 = 7$  **No**  
 $-4xy + 2x^2 = 7$

Origin  <sub>$-x, -y$</sub>   $4(-x)(-y) + 2(-x)^2 = 7$  **yes**  
 $4xy + 2x^2 = 7$



# EVEN + ODD FUNCTIONS

Even  $f(-x) = f(x)$  (y-axis symm.)

Odd  $f(-x) = -f(x)$  (origin symm.)

Is it even, odd or neither?

$$f(x) = 3x^6 - 2x^2 + 4$$

$$f(-x) = 3(-x)^6 - 2(-x)^2 + 4$$

$$= 3x^6 - 2x^2 + 4$$

Even

$$f(x) = x^3 - x + 1$$

$$f(-x) = (-x)^3 - (-x) + 1$$

$$= -x^3 + x + 1$$

$$= -(x^3 - x - 1)$$

Neither

$$f(x) = \frac{4x}{3x^2 - 5}$$

$$f(-x) = \frac{-4x}{3x^2 - 5}$$

$$= -\frac{4x}{3x^2 - 5}$$

Odd

$$\frac{-1}{2} \quad \frac{1}{-2} \quad -\frac{1}{2}$$