Name: ______________________ Date: ______________

Let's review symmetry! To test for:

x – axis symmetry, replace __y__ with __-y__ then simplify to check to see if the equations are the same.

y – axis symmetry, replace __x__ with __-x__ then simplify to check to see if the equations are the same.

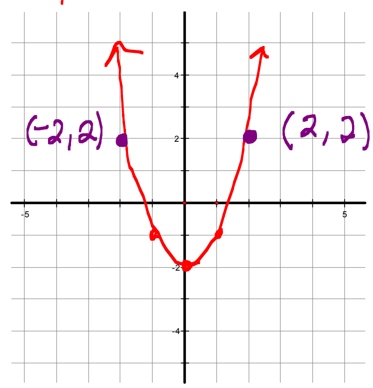
origin symmetry, replace __x__ with __-x__ & replace __y__ with __-y__ then simplify to check to see if the equations are the same.

Even and Odd Functions

A function given by $y = f(x)$ is <u>even</u> if $f(-x) = f(x)$. This means it has __y-axis__ symmetry

What this means: I want to plug in -x for x and simplify to see that my new equation is the same as the orignal.

Graphically:



A function given by $y = f(x)$ is <u>odd</u> if $f(-x) = -f(x)$. This means it has __origin__ symmetry

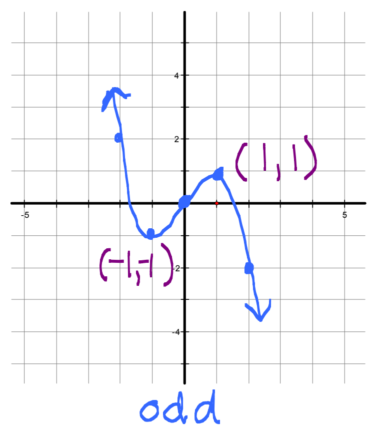
What this means: I want to plug in -x for x and simplify to see that my new equation is exactly opposite my original.

5 opp -5

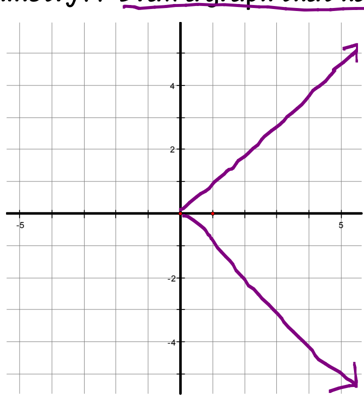
$f(x) = x+3$ $\quad -f(x) = -x-3$

$f(x) = \sqrt{4-x}$ $\quad -f(x) = -\sqrt{4-x}$

Graphically:



What about x – axis symmetry?? Draw a graph that has x – axis symmetry:



Can you think of a reason that this does not relate to even and odd functions?

This is NOT a function

#1 – 6: Determine <u>algebraically</u> if the functions are even, odd or neither. Use correct notation.

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

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

$-x^3 + x$

opp $\Rightarrow$ $\boxed{\text{ODD}}$

2. $f(x)=3x^2-5$

$f(-x) = 3(-x)^2 - 5$

$3x^2 - 5$

same $\Rightarrow$ $\boxed{\text{Even}}$

3. $f(x)=2x^2+7x-9$

$f(-x) = 2(-x)^2 + 7(-x) - 9$

$2x^2 - 7x - 9$

$\boxed{\text{neither}}$

4. $f(x)=5$

$f(-x) = 5$

Even

ODP.

$\sqrt{x}$ it's opp $-\sqrt{x}$

5. $f(x)=\sqrt{5-x}$

$f(-x) = \sqrt{5-(-x)}$

$\sqrt{5+x}$

neither

6. $f(x)=x^{\frac{2}{3}}$

$f(-x) = (-x)^{2/3}$

$x^{2/3}$

$\boxed{\text{Even}}$

$(-4)^{2/3}$

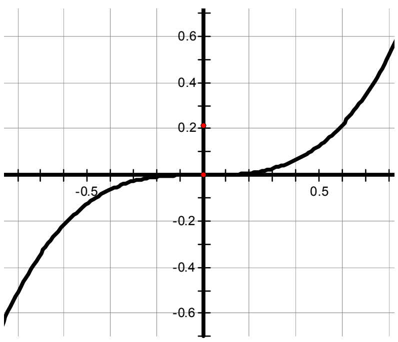
$(16)^{\frac{1}{3}}$

$\sqrt[3]{16}$

$\frac{1}{x^{2/3}}$

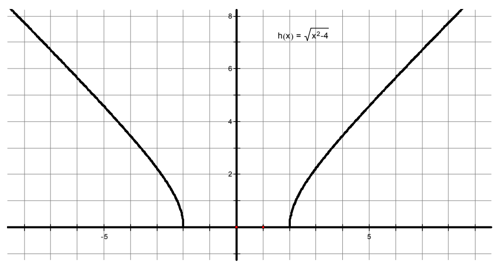
#7 – 12: Determine if the functions are even, odd or neither by looking for symmetry.

7.)



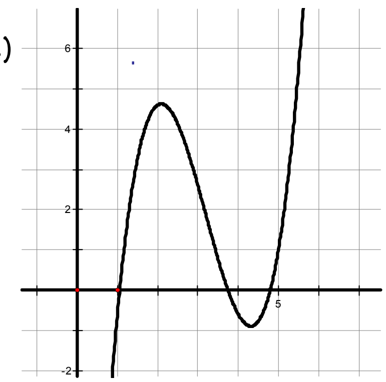
origin $\Rightarrow$ odd

8.)



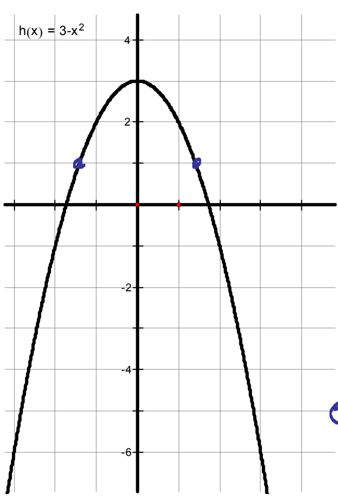
y-axis $\Rightarrow$ even

9.)



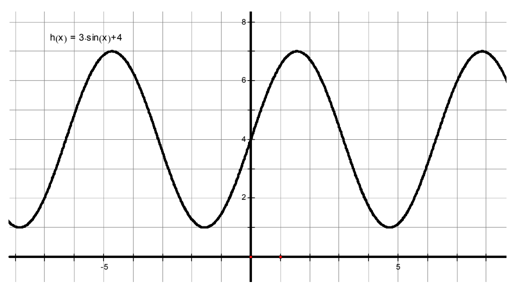
neither

10.)



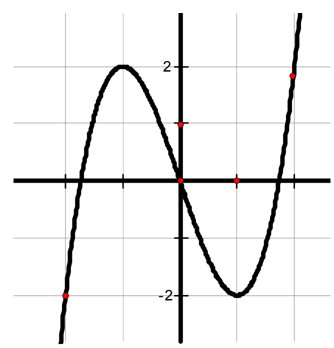
even

11.)



neither

12.)



odd

Homework: p. 154 #19 – 22 b, 23 – 26 c, 27 – 34