

Name: _____ Date: _____

Even and Odd Functions

Algebraically

- A function is Even if:
 - All of the exponents of the variable are even.
- A function is Odd if:
 - All of the exponents of the variable are odd.
- A function is Neither if:
 - The exponents are a Mix of odd and even.

!CAUTION OF THE CONSTANTS!

Remember: All constants really have a x^0 , and x^0 is even.

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

Odd

If yw see 1 x 's, it's x^1

EX.2 $f(x) = x^2 + 1x^0$

Even

If yw see 0 x 's, it's x^0

EX.3: $f(x) = 4x^3$

odd

EX.4: $f(x) = x^3 + 4x^1 + 7x^0$

Neither

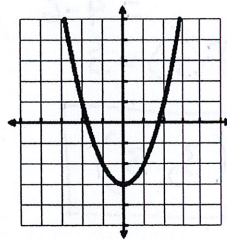
Graphically

You can fold it on the y-axis, and it matches up perfectly

- A function is Even if:
 - The graph reflects across the y-axis.
- A function is odd if:
 - The graph has 180° rotation symmetry about the origin.

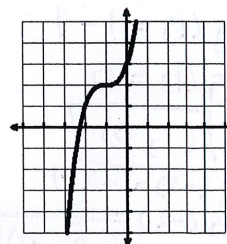
If yw turn it upside-down and it looks the same. Reflection over the x-axis and then a reflection over the y-axis. **IT MUST GO THROUGH THE ORIGIN!**

EX.1



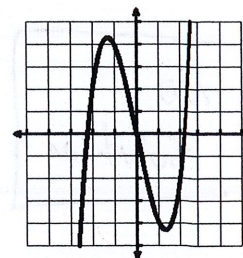
Even

EX.2



Neither

EX.3



Odd

Points of Intersection

Algebraically

1. Set the equations equal to each other.
2. Solve for x.
3. Plug x into either equation to find y.
4. Write answer as an ordered pair.

EX.1 $f(x) = x^2 - 6$ $g(x) = x^2 - 2x$

$$\begin{array}{r} x^2 - 6 = x^2 - 2x \\ -x^2 \quad -x^2 \\ \hline -6 = -2x \\ \frac{-6}{-2} = \frac{-2x}{-2} \\ 3 = x \end{array}$$

$$\begin{array}{l} f(3) = (3)^2 - 6 \\ = 9 - 6 \\ f(3) = 3 \end{array}$$

(3, 3)

EX.2 $f(x) = x^2 + 2x - 3$ $g(x) = x - 1$

$$\begin{array}{r} x^2 + 2x - 3 = x - 1 \\ -x + 1 \quad -x + 1 \\ \hline x^2 + 1x - 2 = 0 \\ (x - 1)(x + 2) = 0 \\ x = 1 \quad x = -2 \end{array}$$

$$\begin{array}{l} g(1) = 1 - 1 \\ g(1) = 0 \\ \hline g(-2) = -2 - 1 \\ g(-2) = -3 \end{array}$$

(1, 0)
(-2, -3)

EX.3 $f(x) = x^2 + 2x + 2$ $g(x) = 2x + 1$

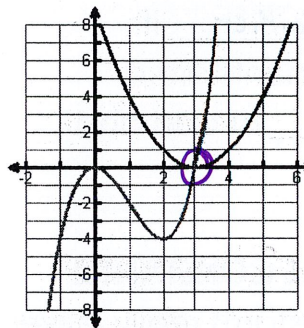
$$\begin{array}{r} x^2 + 2x + 2 = 2x + 1 \\ -2x - 1 \quad -2x - 1 \\ \hline x^2 + 1 = 0 \\ \frac{x^2}{\sqrt{x^2}} + \frac{1}{-1} = \frac{0}{-1} \\ x = \sqrt{-1} \end{array}$$

No Solution

Graphically

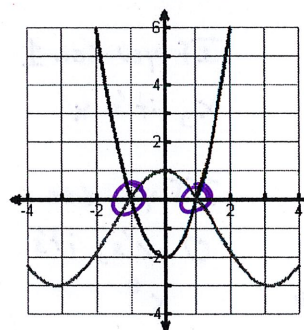
1. Graph both functions on ONE coordinate plane.
2. Find where the graphs intersect.
3. Write answer as an coordinate point (ordered pair).

EX.1



(3, 0)

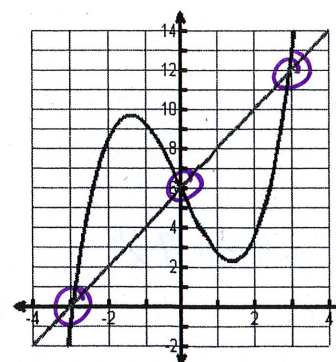
EX.2



(-1, 0)

(1, 0)

EX.3



(-3, 0)

(0, 6)

(3, 12)