

## LESSON #6: EVEN/ODD FUNCTIONS

**Do Now:**

1. For the following functions, label it odd or even **degree** and describe the end behavior.

a)  $f(x) = x^8 - x$

b)  $f(x) = x^5 + x^4 - 2x^7 + 7$

2. What happens to the coordinates  $(x,y)$  when its reflected over the y-axis?

3. What happens to the coordinates  $(x,y)$  when its reflected over the origin?

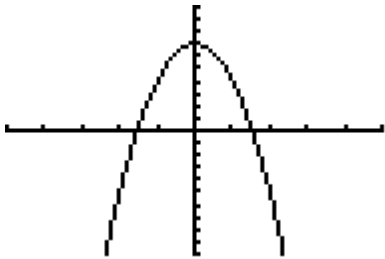
4. Given:  $f(x) = x^6$ , evaluate  $f(-1)$

5. Given:  $f(x) = x^7$ , evaluate  $f(-1)$

We use the term **even function** when a function  $f$  satisfies the equation \_\_\_\_\_ for every number  $x$  in its domain. When we plug in " $-x$ ", the equation does not change.

Consider the graph of the function

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

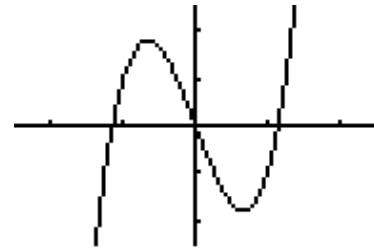


Evaluate  $f(-x)$ .

We use the term **odd function** when a function  $f$  satisfies the equation \_\_\_\_\_ for every number  $x$  in its domain. When we plug in " $-x$ ", all the signs of the equation changes.

Consider the graph of the function

$$f(x) = 3x^3 - 4x.$$



Evaluate  $f(-x)$ .

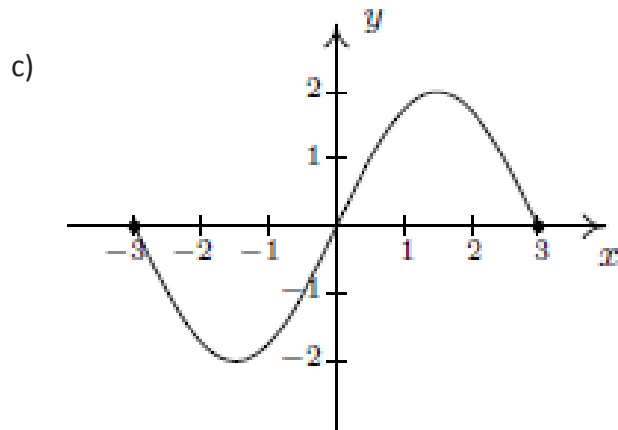
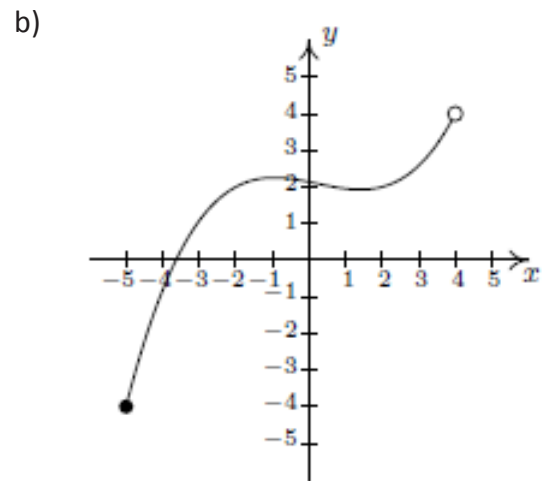
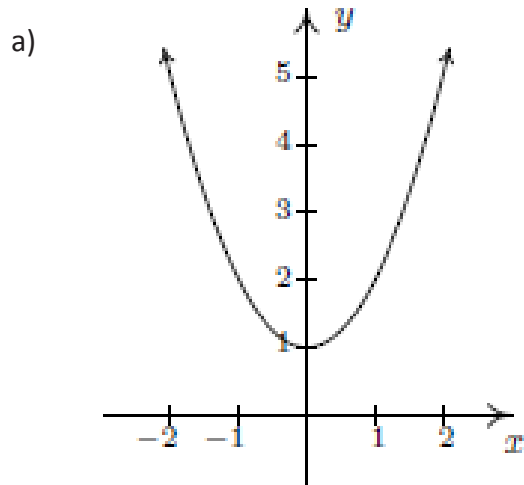
In general, an **EVEN** function has the following properties:

- A) Its graph is symmetric about the \_\_\_\_\_.
- B) The exponents of all terms in its equation are \_\_\_\_\_ and there can be \_\_\_\_\_.
- C)  $f(-x) =$  \_\_\_\_\_

In general, an **ODD** function has the following properties:

- A) Its graph is symmetric about the \_\_\_\_\_.
- B) The y-intercept is \_\_\_\_\_
- C) The exponents of all terms in its equation are \_\_\_\_\_ and there can be \_\_\_\_\_.
- D)  $f(-x) =$  \_\_\_\_\_

1) Determine if the graphs represent an odd function, an even function, or neither.



2) What happens when you evaluate  $f(-x)$  for each of the functions? Sketch a graph for each of the functions.

a)  $f(x) = x^4$

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

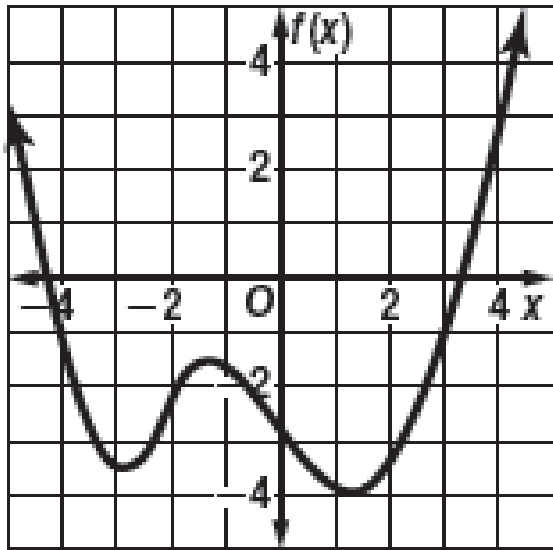
3) What happens when you evaluate  $f(-x)$  for each of the functions? Sketch a graph for each of the functions.

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

b)  $f(x) = -x^5 - 3x^3 + 4x$

4) For each graph shown, determine:

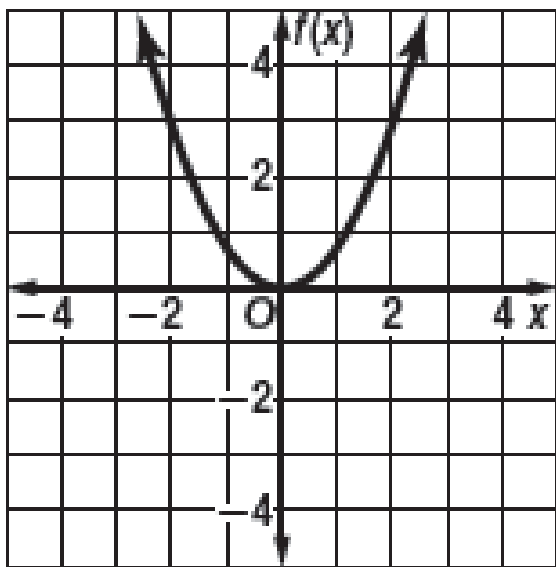
- a) If it represents an odd or even **degree** function
- b) If it represents an odd or even **function** or neither



a)

b)

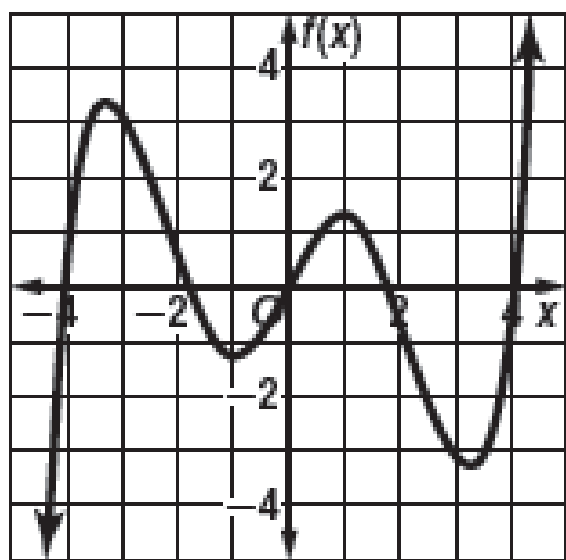
5)



a)

b)

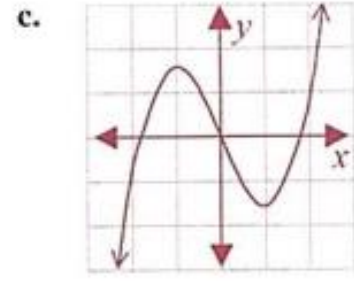
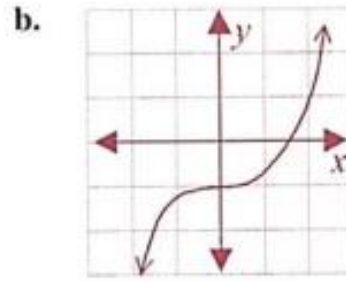
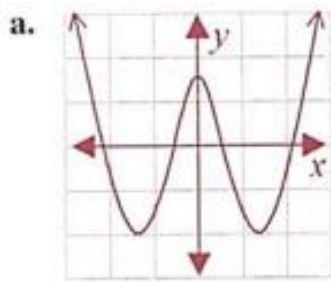
6)



a)

b)

7. Determine what kind of symmetry, if any, each of the following functions has.



8. Determine what kind of symmetry, if any, each of the following functions has.

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

b.  $f(x) = 2x^3 + x$

c.  $f(x) = x^2 - 2x$

d.  $f(x) = \frac{x}{x^2 - 1}$

9. For each of the following functions, determine if it is even, odd, or neither.

a.  $f(x) = x^4 - bx^2 + c$

b.  $f(x) = x^3 + bx$

For #10-11 WITHOUT THE USE OF YOUR CALCULATOR:

- a) Determine the degree
- b) Determine the roots
- c) Describe the end behavior

10)  $y = (x+2)(x-3)(x+1)$

11)  $y = (x-6)^4$

12. Solve for  $x$  in simplest radical form using any method.

$$5x^2 - 4x - 2 = 0$$

13. The function  $j(x) = x^3 + 9x^2 + 24x + 16$  has a factor of  $(x + 1)$ . Determine the remaining factors of this function.