

## 2.5 Investigating: Even and Odd Functions

### Investigating: Even and Odd Functions

Use your graphing calculator to graph each of the following functions. Draw a sketch of the graph under its equation.

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

b)  $f(x) = 2x^4 + 2x^2$

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

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



All of the above functions are called **EVEN** functions.

a) What type of symmetry does each graph have?

b) What is special about the exponents of each term in the functions?

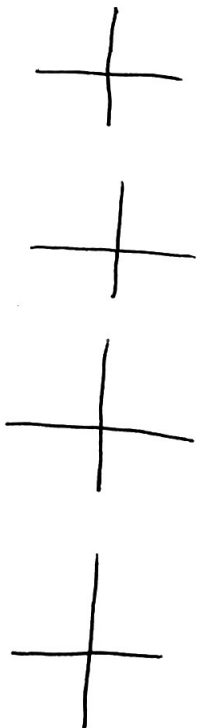
Use your graphing calculator to graph each of the following functions. Draw a sketch of the graph under its equation.

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

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

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

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



All of the above functions are called **ODD** functions.

a) What type of symmetry does each graph have?

b) What is special about the exponents of each term in the equations?

In general,

An **EVEN** function has the following properties:

- i) Its graph is symmetric about the \_\_\_\_\_
- ii) The exponents of all terms in its equation are \_\_\_\_\_

An **ODD** function has the following properties:

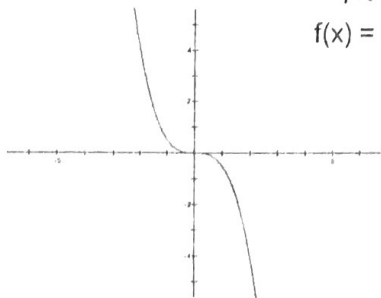
- i) Its graph is symmetric about the \_\_\_\_\_
- ii) The exponents of all terms in its equation are \_\_\_\_\_

Consider the function  $f(x) = x^3 - x^2 + x$ , would it be even or odd? Investigate all ~~three~~ <sup>two</sup> properties from above.

Such a function is **NEITHER** even nor odd.

Example:

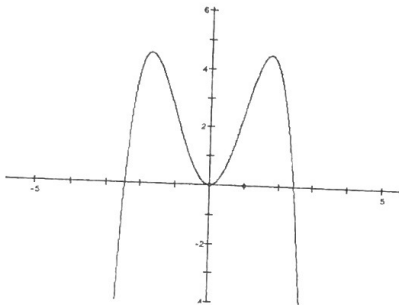
Determine whether the following is even, odd or neither. You must justify your answer by discussing all ~~three~~ <sup>two</sup> properties.



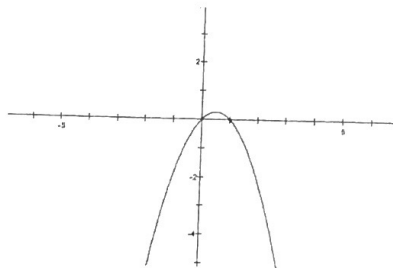
## 2.5 Investigating: Even and Odd Functions - Worksheet

Determine whether each of the following is even, odd or neither. You must justify your answer by discussing all ~~three~~ <sup>two</sup> properties.

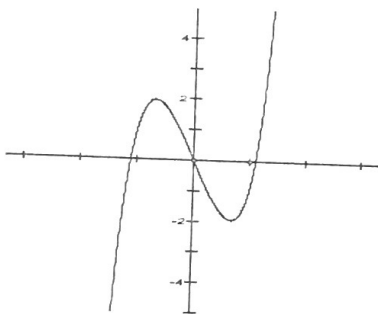
a)  $f(x) = -1/2x^4 + 3x^2$



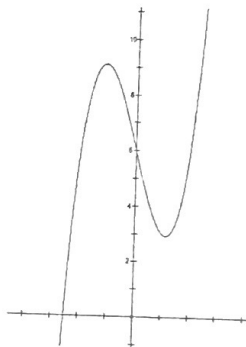
b)  $f(x) = -x^2 + x$



c)  $f(x) = x^5 + 2x^3 - 4x$

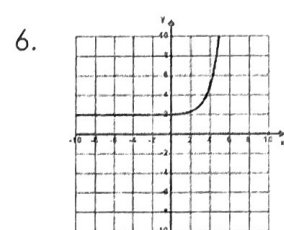
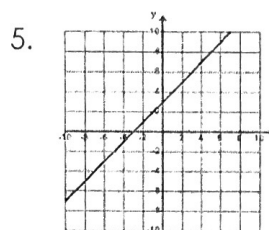
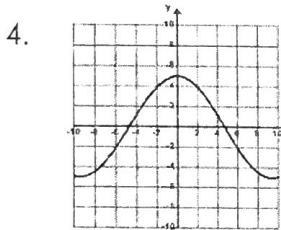
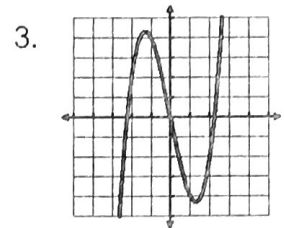
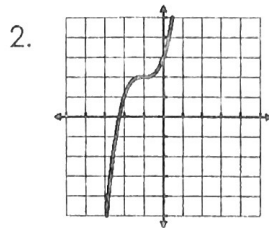
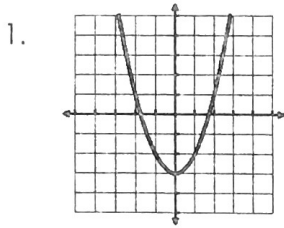


d)  $f(x) = x^3 - 4x + 6$



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Tell whether the function is even, odd, or neither.



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

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

9.  $f(x) = x^3 + 4x + 1$

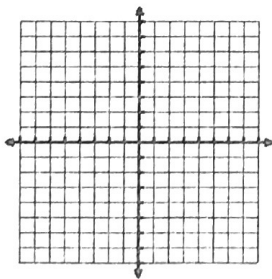
10.  $f(x) = \frac{1}{2}x^4 + 9$

11.  $f(x) = 5x + 1$

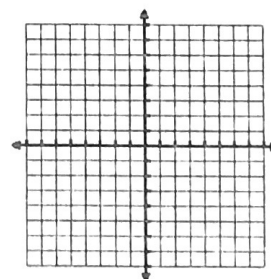
12.  $f(x) = 5$

Think about:

13. Can a linear function ever be even or odd? If so, sketch an example.



14. Can an exponential function ever be even or odd? If so, sketch an example.



15. If the following points are on an **odd** function, what other points are on the function? Give the coordinates.

