

Name: \_\_\_\_\_ Date: October 12, 2011

1. Define odd function

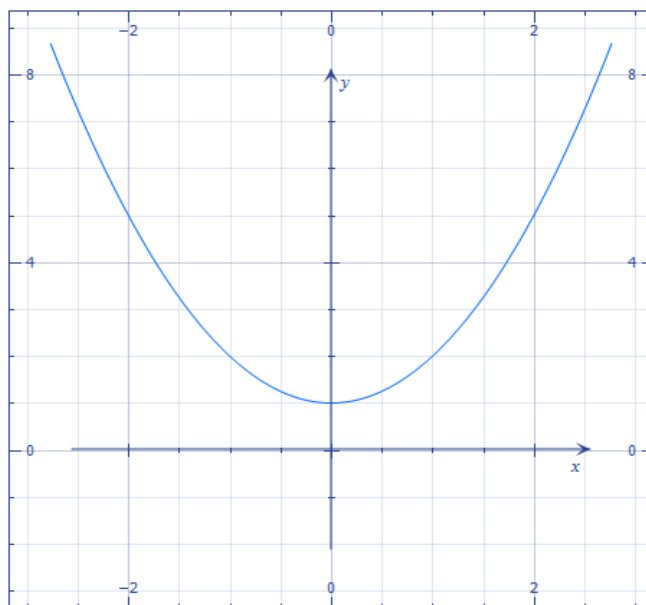
A function  $f$  is odd  $f(-x) = -f(x)$  for all  $x$ .

2. Define even function

A function  $f$  is even if  $f(-x) = f(x)$  for all  $x$ .

3. For  $f(x) = x^2 + 1$  fill out the following table using the values of  $x$  given in class. Graph the function.

$x$	$-x$	$f(x)$	$f(-x)$
0	0	1	1
1	-1	2	2
2	-2	5	5
3	-3	10	10
5	-5	25	25
10	-10	101	101



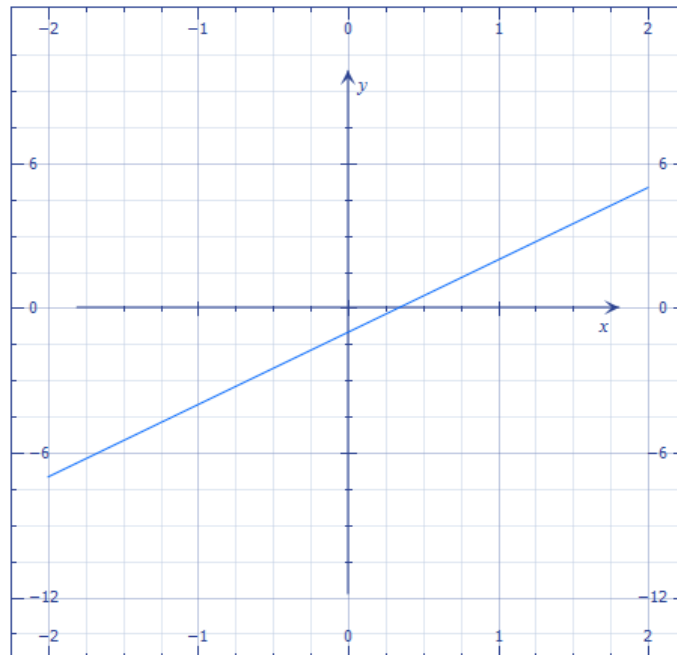
The function appears to be even. To prove it, calculate  $f(-x)$  and show that it equals  $f(x)$ .

$$f(-x) = (-x)^2 + 1 = x^2 + 1 = f(x)$$

So, the function is even.

4. For  $f(x) = 3x - 1$  fill out the following table using the values of  $x$  given in class. Then graph the function.

$x$	$-x$	$f(x)$	$f(-x)$
0	0	-1	-1
1	-1	2	-4
2	-2	5	-7
3	-3	8	-10
5	-5	14	-16
10	-10	29	-31



The function doesn't appear to be either even or odd. To prove it, calculate  $f(-x)$  and show that it is equal to neither  $f(x)$  or  $-f(x)$ .

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

For  $f(x)$  to be even it must be true that

$$-3x - 1 = 3x - 1$$

$$-3x = 3x$$

which is true only for  $x = 0$ , not for all  $x$ . So, the function is not even.

For  $f(x)$  to be odd it must be true that

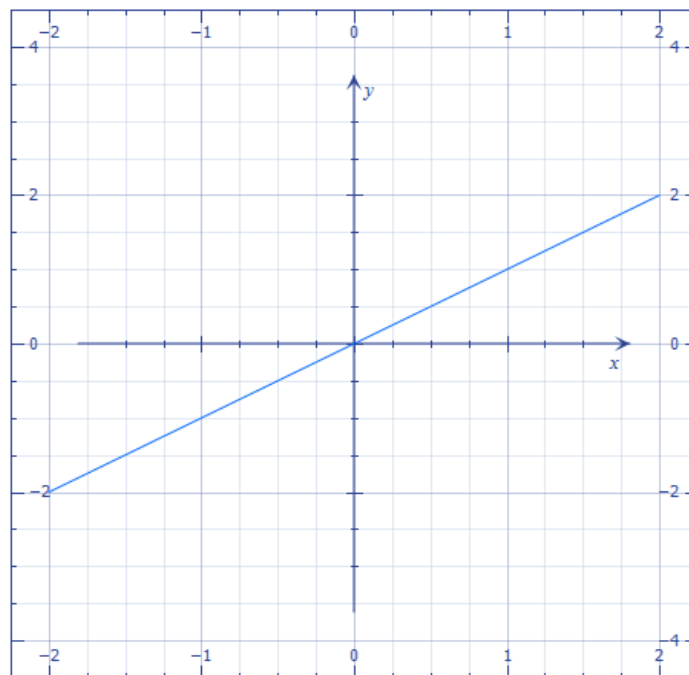
$$-3x - 1 = -(3x - 1)$$

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

which is true only if  $-1 = 1$  and that is never true. So, the function is not odd.

5. For  $f(x) = x$  fill out the following table using the values of  $x$  given in class. Then graph the function.

$x$	$-x$	$f(x)$	$f(-x)$
0	0	0	0
-1	1	-1	1
5	-5	5	-5
15	-15	15	-15
100	-100	100	-100



The function appears to be odd. To prove it, calculate  $f(-x)$  and show that it equals  $-f(x)$ .

$$f(-x) = -x = -f(x)$$

So, the function is odd.