4.2 Even and Odd Functions

PRACTICE

Determine algebraically whether each function is even, odd, or neither. SHOW WORK!

1. $y = x^3 + x$

ODD $(-x,-y)$

$-y = (-x)^3 + (-x)$

$-y = -x^3 - x$

$y = x^3 + x$

2. $y = x^2 + x - 3$

~~ODD~~ $(-x,-y)$

$-y = (-x)^2 + (-x) - 3$

$-y = x^2 - x - 3$

$y = -x^2 + x + 3$

~~Even~~ $(-x,y)$

$y = (-x)^2 + (-x) - 3$

$y = x^2 - x - 3$

NEITHER

3. $y = x^4 + 3x^2$

Even $(-x,y)$

$y = (-x)^4 + 3(-x)^2$

$y = x^4 + 3x^2$

4. $g(x) = \dfrac{4 + x^2}{1 + x^4}$

Even $(-x,y)$

$g(-x) = \dfrac{4 + (-x)^2}{1 + (-x)^4}$

$g(-x) = \dfrac{4 + x^2}{1 + x^4}$

5. $h(x) = \dfrac{x}{1 + x^2}$

ODD $(-x,-y)$

$-h(-x) = \dfrac{-x}{1 + (-x)^2}$

$-h(-x) = \dfrac{-x}{1 + x^2}$

$h(-x) = \dfrac{x}{1 + x^2}$

6. $f(x) = \dfrac{x^5 - 2x^3 - x}{x^2 + 1}$

ODD $(-x,-y)$

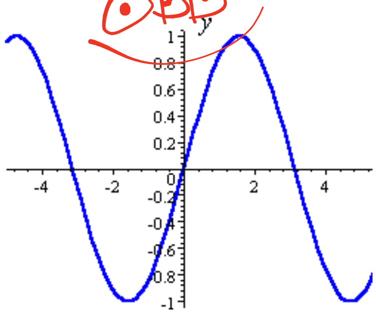
$-f(-x) = \dfrac{(-x)^5 - 2(-x)^3 - (-x)}{(-x)^2 + 1}$

$-f(-x) = \dfrac{-x^5 + 2x^3 + x}{x^2 + 1}$

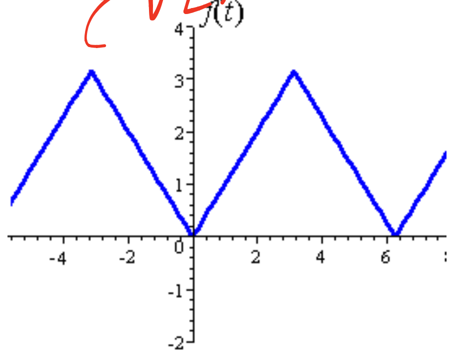
$f(-x) = \dfrac{x^5 - 2x^3 - x}{x^2 + 1}$

Use the graph to determine if the function is even, odd, or neither.		

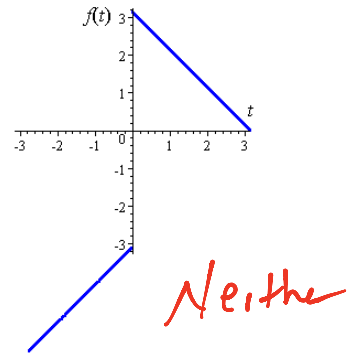
7. ODD



8. EVEN



9. Neither



Use the table to determine if the function is even, odd, or neither.

10.

x	*y*
-4	-128
-5	-250
-6	-432
4	128
5	250
6	432

ODD

11.

x	*y*
-3	-11
-2	3
-1	5
1	-3
2	-1
3	13

NEITHER

12.

x	*y*
-3	-5
-2	0
-1	3
1	3
2	0
3	-5

Even

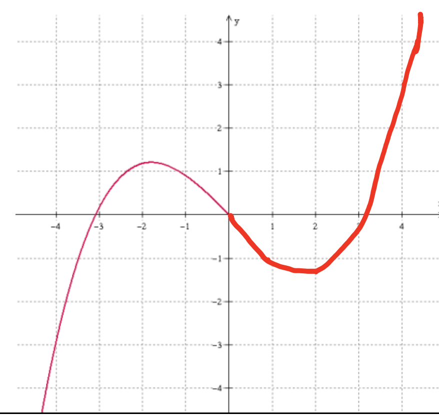
Given the *f*(*x*) is even, fill in the table.

13.

x	*f*(*x*)
-5	10.5
7	22.5
-9	38.5
-7	22.5
5	10.5
9	38.5

Given that the *f*(*x*) is continuous on (-5, 5) and odd, draw the graph *f*(*x*) from (0,5)

14.



REVIEW SKILLS

Use the quadratic formula to solve. Express your solution(s) in exact and decimal form.

1. $9x^2 - 3x = -4$ $\quad 9x^2-3x+4=0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x=\frac{-(-3)\pm\sqrt{(-3)^2-4(9)(4)}}{2(9)}$

$=\frac{3\pm\sqrt{9-144}}{18}$

$=\frac{3\pm\sqrt{-135}}{18}$

$=\frac{3\pm 3i\sqrt{15}}{18}$

$=\frac{3(1\pm i\sqrt{15})}{18}$

$\rightarrow x=\frac{1\pm i\sqrt{15}}{6}$

$x\approx \frac{1}{6}\pm 3.873i$

2. $9k^2 - 20 = -12k$ $\quad 9k^2+12k-20$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x=\frac{-(12)\pm\sqrt{(12)^2-4(9)(-20)}}{2(9)}$

$x=\frac{-12\pm\sqrt{144+720}}{18}$

$x=\frac{-12\pm\sqrt{864}}{18}$

$x=\frac{-12\pm12\sqrt{6}}{18}$

$x=\frac{12(-1\pm\sqrt{6})}{18}$

$\rightarrow x=\frac{2(-1\pm\sqrt{6})}{3}$

$x=\frac{-2\pm2\sqrt{6}}{3}$

$x\approx -2.300, .966$