Homework 2.2

Determine if the following functions are even, odd, or neither even nor odd. Show the algebraic analysis that justify your answers. Then, graph each function on the calculator ~~and explain why~~ to confirm that the graph confirms the algebraic analysis.

1. $f(x) = 5 - 3x$

$f(-x) = 5 - 3(-x)$

$f(-x) = 5 + 3x$

$f(-x) \neq f(x)$

$f(-x) \neq -f(x)$

$\therefore f(x)$ is neither EVEN nor ODD b/c

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

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

$= -x^3 + 5x$

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

$\therefore f(-x) = -f(x)$.

$\therefore f(x)$ is ODD

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

$f(-x) = (-x)|2(-x)| - 3(-x)^3$

$= -x|-2x| - 3(-x^3)$

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

$f(-x) = -[x|2x| - 3x^3]$

$\therefore f(-x) = -f(x)$

$\therefore f(x)$ is ODD

4. $f(x) = x^2 - 4$

$f(-x) = (-x)^2 - 4$

$f(-x) = x^2 - 4$

$\therefore f(-x) = f(x)$

$\therefore f(x)$ is EVEN

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

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

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

$\therefore f(-x) = f(x)$

$\therefore f(x)$ is EVEN

6. $f(x) = \sqrt{x^2 - 3x}$

$f(-x) = \sqrt{(-x)^2 - 3(-x)}$

$f(-x) = \sqrt{x^2 + 3x}$

$\therefore f(-x) \neq f(x)$

$\therefore f(-x) \neq -f(x)$

$\therefore f(x)$ is neither EVEN nor ODD

7. $f(x) = x^6 - |2x^3|$

$f(-x) = (-x)^6 - |2(-x)^3|$

$= x^6 - |2 \cdot (-x^3)|$

$= x^6 - |-2x^3|$

$f(-x) = x^6 - |2x^3|$

$\therefore f(-x) = f(x)$

$\therefore f(x)$ is EVEN

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

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

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

$= \dfrac{-3x^3 + 2x}{-x^5}$

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

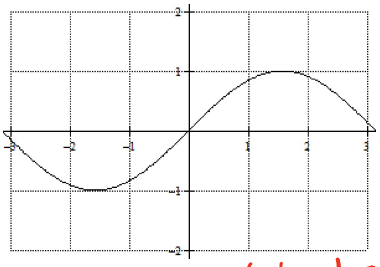
$f(-x) = \dfrac{3x^3 - 2x}{x^5}$

$\therefore f(-x) = f(x)$

$\therefore f(x)$ is EVEN

For each of the functions graphed below, determine if they represent even or odd functions. If the function is neither even nor odd, state neither. Give a reason for your choice.

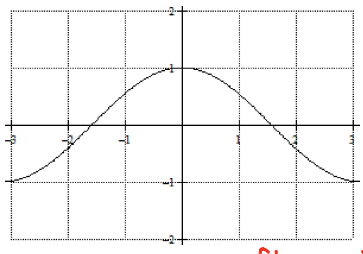
9.



The graph has rotational symmetry at the origin.

∴ ODD FUNCTION

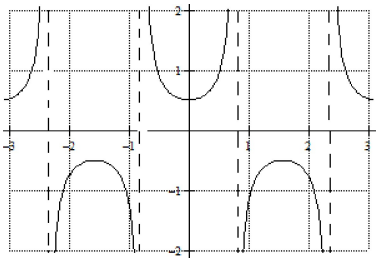
10.



The graph has reflectional symmetry about y-axis.

∴ EVEN FUNCTION

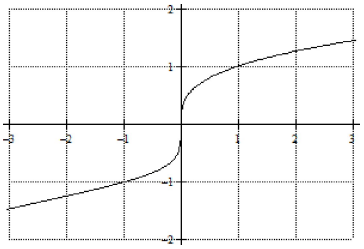
11.



The graph has reflectional symmetry about y-axis.

∴ EVEN FUNCTION

12.



The graph has rotational symmetry at the origin

∴ ODD FUNCTION

For each of the following tables of values, determine if the function represented is even or odd. If the function is neither even nor odd, state neither. Give a reason for your choice.

13.

x	–7	–3	–2	1	2	3	7
$F(x)$	2	5	–1	3	1	–5	–2

has no pair

For every point (x,y) there is not have a point $(-x,-y)$ or $(-x,y)$

∴ $F(x)$ is neither ODD nor Even

14.

x	–4	–2	0	2	4
$F(x)$	2	–5	8	–5	2

For every point (x,y) there is a point $(-x, y)$

∴ $F(x)$ is EVEN

15.

x	–8	–5	–1	0	1	5	8
$F(x)$	–2	–3	1	0	–1	3	2

For every point (x,y) there is a point $(-x,-y)$

∴ $F(x)$ is ODD