Precalculus Name: _____

Even and Odd Functions

Terminology	Definition	Illustration	Type of symmetry of graph
f is an ***even*** function	$f(x) = f(-x)$ for every x in the domain	$y = f(x) = x^2$	With respect to the y-axis
f is an ***odd*** function	$-f(x) = f(-x)$ for every x in the domain	$y = f(x) = x^3$	With respect to the origin

Determine whether f is even, odd or neither even nor odd.

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

$f(1) = 5(1)^3 + 2(1)$

$= 7$

$f(-1) = 5(-1)^3 + 2(-1)$

$= -7$

odd

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

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

$= -2$

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

$= -2$

Even

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

$f(1) = 3(1)^4 + 2(1)^2 - 5$

$= 0$

$f(-1) = 3(-1)^4 + 2(-1)^2 - 5$

$= 0$

Even

4. $f(x) = 7x^5 - 4x^3$

$f(1) = 7(1)^5 - 4(1)^3$

$= 3$

$f(-1) = 7(-1)^5 - 4(-1)^3$

$= -3$

Odd

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

$f(1)=8(1)^3-3(1)^2$ $f(-1)=8(-1)^3-3(-1)^2$

$=5$ $=-11$

Neither

6. $f(x)=12$

Even

7. $f(x)=\frac{1}{x}$

$f(1)=\frac{1}{1}$ $f(-1)=\frac{1}{-1}$

$=1$ $=-1$

Odd

8. $f(x)=3x^2-5x+1$

$f(1)=3(1)^2-5(1)+1$ $f(-1)=3(-1)^2-5(-1)+1$

$=-1$ $=9$

Neither

9. $f(x)=\sqrt{x^2+4}$

$f(1)=\sqrt{1^2+4}$ $f(-1)=\sqrt{(-1)^2+4}$

$=\sqrt{5}$ $=\sqrt{5}$

Even

10. $f(x)=\sqrt[3]{x^3-x}$

$f(1)=\sqrt[3]{1^3-1}$ $f(-1)=\sqrt[3]{(-1)^3-(-1)}$

$=0$ $=0$

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

$=\sqrt[3]{6}$ $=\sqrt[3]{10}$

Neither