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

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

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

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

$\therefore$ odd

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

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

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

$\therefore$ even

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

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

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

even

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

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

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

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

odd

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

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

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

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

neither

6. $f(x)=12$

$f(-x)=12$

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

even

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

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

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

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

odd

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

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

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

neither

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

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

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

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

even

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

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

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

odd

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

	Function	Even	Odd	Neither
1	$f(x)=5x^2-4x+3$			✓
2	$g(x)=3x^3-4x$		✓	
3	$h(x)=-2x^4+3x^2$	✓		
4	$f(x)=-2x^5+3x^3-5x^2$			✓
5	$n(x)=\sqrt{x^2+9}$	✓		
6	$s(x)=3x^{\frac{1}{3}}$		✓	
7	$g(x)=\sqrt{1-x^2}$	✓		
8	$h(x)=x^6+2x^4-3x^2-4$	✓		
9	$m(x)=(x-2)^2$			✓
10	$p(x)=2x\sqrt{x^2+4}$		✓	

Expression Check: 4(# of Evens) + 3(# of Odds) – (# of Neither) = 22

4( ) + 3( ) – ( ) =