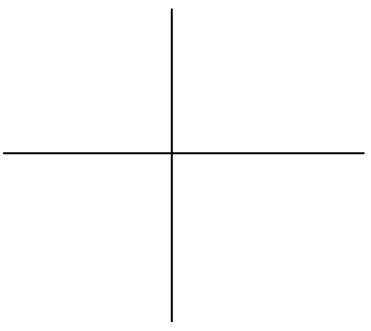
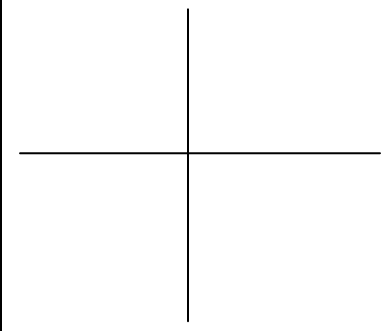
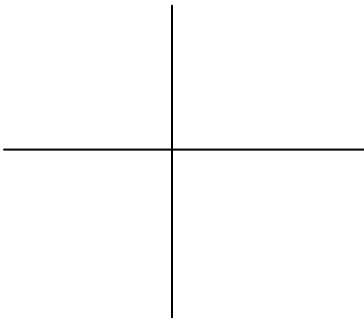
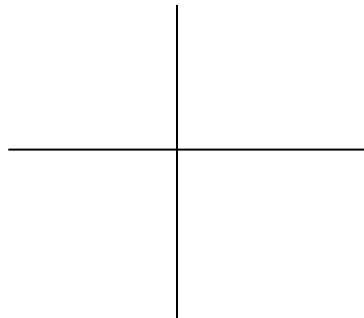


Odd and Even Functions Extravaganza

Stan Hartzler Archer City High School

	ODD	EVEN
	$y = f(x) = 3x^5 - 8x^3 + 3x$	$y = g(x) = x^4 - 8x^2 + 9$
1. What about these functions? (exponents?)		
2. Graph the functions.		
3A. What do you notice about the graphs? (<i>Symmetry?</i>)		
3B. The wire discussions?		
4. What is awesome about segments from a point on the graph?		
5. Complete charts. Pattern? Tie to graphs? <i>Note graph point pairs.</i> Substitute (by hand): $f(2)$, $f(-2)$, $g(2)$, $g(-2)$ $f(2) = 3 \bullet 2^5 - 8 \bullet 2^3 + 3 \bullet 2$ $f(-2) = 3(-2)^5 - 8(-2)^3 + 3(-2)$ $g(2) = 2^4 - 8(2)^2 + 9$ $g(-2) = (-2)^4 - 8(-2)^2 + 9$ Observation? Why?		
6A. Summarize odd/even functions per parent-function transformations.		
6B. Analyze.		
7. If x, y is on graph...		

Odd and Even Functions Extravaganza KEY?

	ODD	EVEN																																
	$y = f(x) = 3x^5 - 8x^3 + 3x$	$y = g(x) = x^4 - 8x^2 + 9$																																
1. What about these functions? (exponents?)	All exponents are odd.	All exponents are even.																																
2. Graph the functions.																																		
3A. What do you notice about the graphs? (Symmetry?) 3B. The wire discussions?	<u>Symmetrical with respect to the origin.</u> If graph for $x > 0$ were a bent wire, a 180° rotation about $(0,0)$ would place wire atop graph for $x < 0$.	<u>Symmetrical with respect to the y axis.</u> If graph for $x > 0$ were a bent wire, a flip across $x = 0$ (y -axis) would place wire atop graph for $x < 0$.																																
4. What is awesome about segments from a point on the graph?	Segment from a graph point to origin has twin on other side.	Segment from a graph point to y axis ($\perp$) has twin on other side.																																
5. Complete charts. Pattern? Tie to graphs? <i>Note graph point pairs.</i> Substitute (by hand): $f(2)$, $f(-2)$, $g(2)$, $g(-2)$ $f(2) = 3 \bullet 2^5 - 8 \bullet 2^3 + 3 \bullet 2$ $f(-2) = 3(-2)^5 - 8(-2)^3 + 3(-2)$ $g(2) = 2^4 - 8(2)^2 + 9$ $g(-2) = (-2)^4 - 8(-2)^2 + 9$ Observation? Why?	<table><tr><th>x</th><th>y</th></tr><tr><td>-3</td><td>$f(-3) = -522$</td></tr><tr><td>-2</td><td>$f(-2) = -38$</td></tr><tr><td>-1</td><td>$f(-1) = 2$</td></tr><tr><td>0</td><td>$f(0) = 0$</td></tr><tr><td>1</td><td>$f(1) = -2$</td></tr><tr><td>2</td><td>$f(2) = 38$</td></tr><tr><td>3</td><td>$f(3) = 522$</td></tr></table> Odd exponents change no input signs. $f(3)$ is opposite of $f(-3)$. <i>Note graph point pairs.</i>	x	y	-3	$f(-3) = -522$	-2	$f(-2) = -38$	-1	$f(-1) = 2$	0	$f(0) = 0$	1	$f(1) = -2$	2	$f(2) = 38$	3	$f(3) = 522$	<table><tr><th>x</th><th>y</th></tr><tr><td>-3</td><td>18</td></tr><tr><td>-2</td><td>-7</td></tr><tr><td>-1</td><td>2</td></tr><tr><td>0</td><td>9</td></tr><tr><td>1</td><td>2</td></tr><tr><td>2</td><td>-7</td></tr><tr><td>3</td><td>18</td></tr></table> Even exponents turn negative input to positive results. $f(-3) = f(3)$. <i>Note graph point pairs.</i>	x	y	-3	18	-2	-7	-1	2	0	9	1	2	2	-7	3	18
x	y																																	
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6A. Summarize odd/even functions per parent-function transformations. 6B. Analyze.	$f(x) = -f(-x)$  <u>x axis flip + y axis flip</u> means no change in graph of $f(x)$.	$f(x) = f(-x)$  <u>y axis flip</u> means no change in graph of $f(x)$.																																
7. If (x,y) is on graph...	...then $(-x, -y)$ is, too.	...then $(-x, y)$ is, too.																																