Developing Algebraic Tests for Even and Odd Functions

Instructions

1) Take a moment to look over the following functions. See if you notice any patterns or clues as to what aspects of the formula may indicate a function is even or odd.
2) Choose from these examples to work through the following pages.

Goal

You will attempt to develop an algebraic test you can use to determine from the formula whether a function is even or odd.

Even Functions

1) $f(x) = x^2$
2) $f(x) = 3x^2 + 6$
3) $f(x) = x^4 - 6x^2 + 2$
4) $f(x) = |x|$
5) $f(x) = |x|(.1x^4 - x^2 + 2)$
6) $f(x) = |x|^3$
7) $f(x) = \frac{1}{(x+1)(x-1)}$
8) $f(x) = \sqrt{|x^2 - 3|}$

Odd Functions

1) $f(x) = 4x$
2) $f(x) = x^3$
3) $f(x) = x^3 - 6x$
4) $f(x) = .1x^5 - x^3 + 2x$
5) $f(x) = |x|^3(x^3)$
6) $f(x) = .4x\sqrt{|x|}$
7) $f(x) = \frac{x}{(x+1)(x-1)}$
8) $f(x) = \frac{(x^3+1)(x^3-1)}{x}$

Functions that are neither Even nor Odd

1) $f(x) = 4x + 2$
2) $f(x) = |x - 3|$
3) $f(x) = x^4 - 6x^3 + 2$
4) $f(x) = .1x^4 - x^5 + 2x^2$
5) $f(x) = \sqrt{x + 4}$
6) $f(x) = \frac{1}{(x+1)|x-1|}$
7) $f(x) = 2(x - 2|x|) + 3$
8) $f(x) = \sqrt{|x^2 - 2x - 3|}$

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Instructions

1. Select a function from the list on the previous page and write it on the chart below.
2. Mark whether the function is even, odd, or neither.
3. Open the applet: https://www.desmos.com/calculator/0rfczha2oz
4. Replace the existing formula with your function formula after “f(x) = ”.
5. Choose values for x by sliding the point labeled “x”.
6. Using both positive and negative values for x, fill in the rows of your chart.
7. Write down your observations. What patterns (if any) do you notice?
8. Repeat steps 1 through 6. Choose functions that are even, odd, and neither. When you can correctly predict patterns in the numbers, you’ve done enough charts.

f(x) =				**Circle one:** even / odd / neither
x	f(x)	-x	f(-x)	observations

f(x) =				**Circle one:** even / odd / neither
x	f(x)	-x	f(-x)	observations

f(x) =				**Circle one:** even / odd / neither
x	f(x)	-x	f(-x)	observations

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f(x) =				**Circle one:** even / odd / neither
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f(x) =				**Circle one:** even / odd / neither
x	f(x)	-x	f(-x)	observations

9. Based on your observations, can you make an algebraic statement about even and/or odd functions that always holds true?