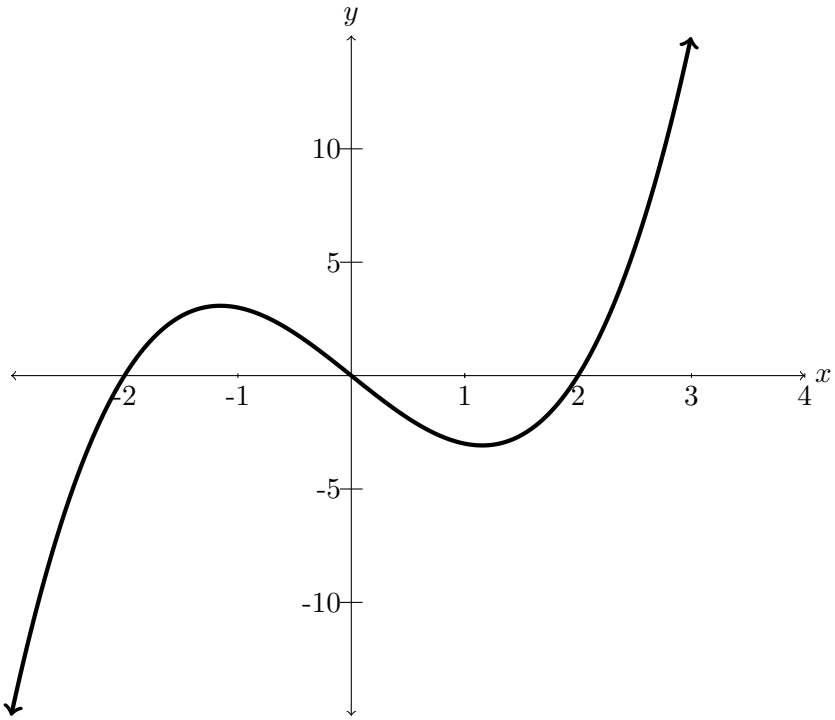
MATH 156: Precalculus
Fall 2015
Worksheet §2.6: Transformations of Graphs

By the end of this section, you want to know the transformations below affect the graph of $f(x)$. (Assume $c > 0$.)

- $f(x + c)$ [translates c units left]
- $f(x - c)$ [translates c units right]
- $f(x) + c$ [translates c units up]
- $f(x) - c$ [translates c units down]
- $-f(x)$ [reflects about the x-axis]
- $f(-x)$ [reflects about the y-axis]
- $cf(x)$ [stretches or shrinks vertically]
- $f(cx)$ [stretches of shrinks horizontally]
- $|f(x)|$ [reflects portions of the graph below the x-axis to be above the$x$-axis]

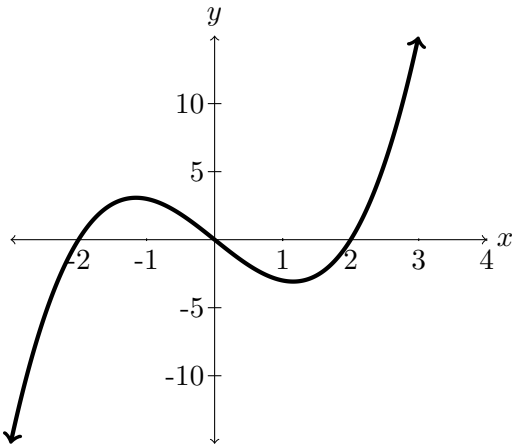
Example: Graph $f(x) = \sqrt{x}$, $g(x) = \sqrt{-x}$, $h(x) = -\sqrt{x}$. Plot at least three points on each graph to confirm you picture is correct.

Below is graphed the function $h(x) = x(x-2)(x+2) = x^3 - 4x$ and the line $y = 4$. Use the graphs to answer questions (a) through (e).

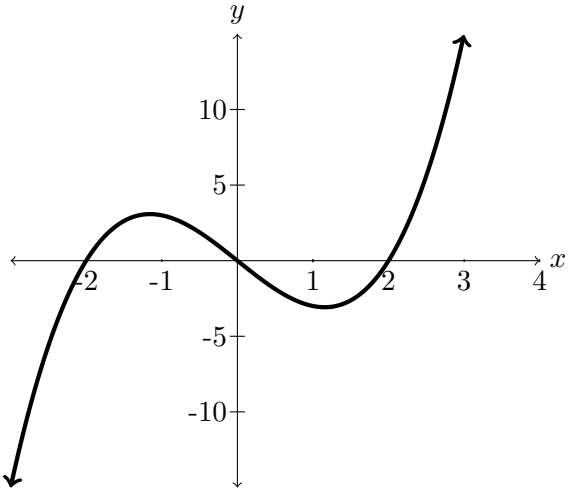


On the graphs below, sketch (i) $y = 3(x^3 - 4x)$, (ii) $y = (-1/2)(x^3 - 4x)$, (iii) $y = |x^3 - 4x|$

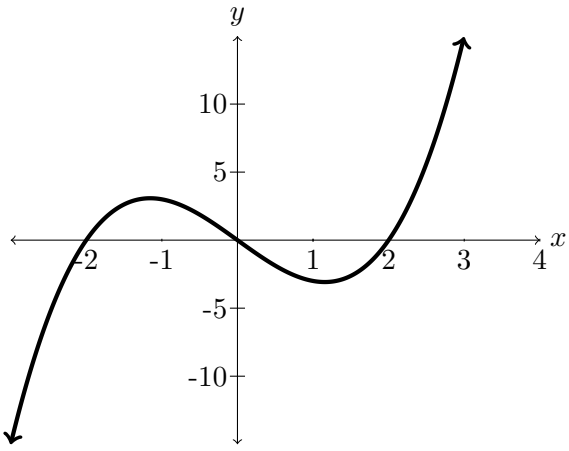
(i)



(ii)



(iii)



On the same axes, graph $f(x) = x^2 + 1$, $g(x) = (3x)^2 + 1$, and $h(x) = \left(\frac{x}{2}\right)^2 + 1$

Graph $f(x) = \frac{-1}{x-2} + 3$

Graph an even function and an odd function.