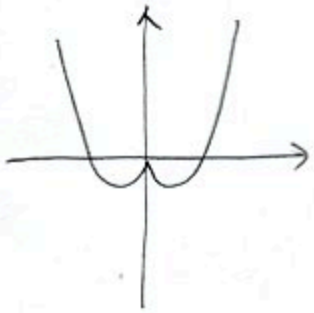
College Algebra — Joysheet 7
MAT 140, Spring 2016 — D. Ivanšić

Name: Saul Ocean
Covers: 2.4, 2.5 *Show all your work!*

1. (21pts) For the following functions:
a) determine algebraically whether they are odd, even, or neither
b) use the calculator to draw their graphs on paper and verify your conclusions by stating symmetry.

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

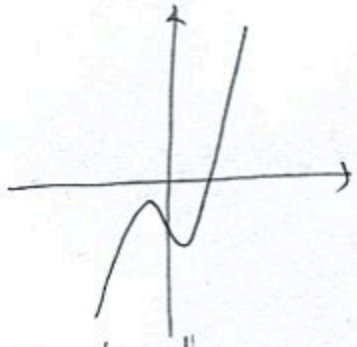
$f(-x) = (-x)^2 - 3|-x|$
$= x^2 - 3|x|$
$= f(x)$
even function



sym. w.r.t. y-axis

$g(x) = x^3 + x^2 - 3x - 5$

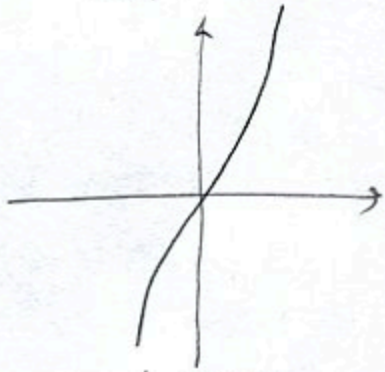
$g(-x) = (-x)^3 + (-x)^2 - 3(-x) - 5$
$= -x^3 + x^2 + 3x - 5$
$\neq g(x)$ so neither
$\neq -g(x)$



graph not sym. wrt y-axis or origin

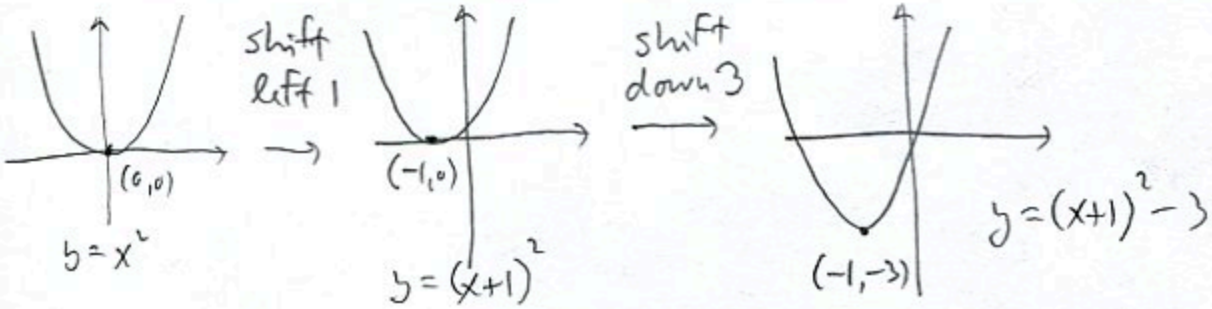
$h(x) = x^3 + 5x$

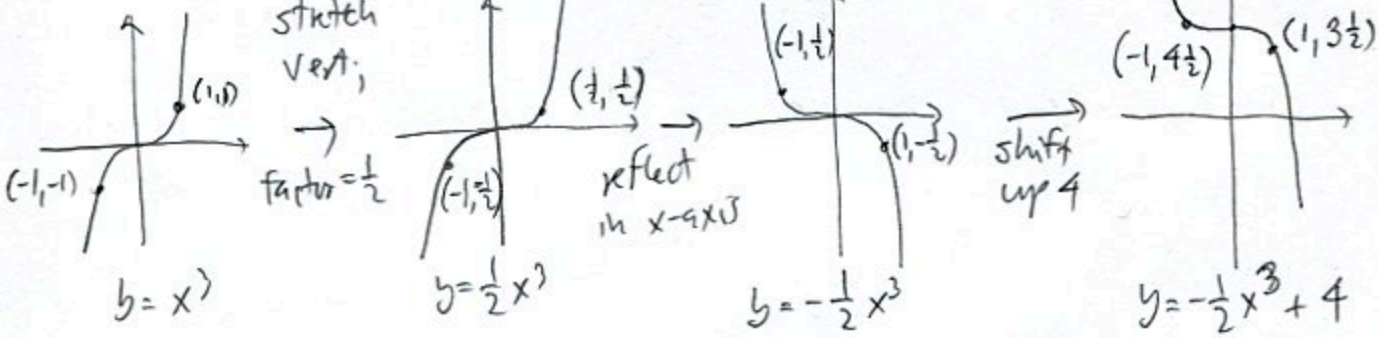
$h(-x) = (-x)^3 + 5(-x)$
$= -x^3 - 5x =$
$= -h(x)$
odd function



graph sym. wrt. origin

2. (16pts) Using transformations, draw the graphs of $f(x) = (x+1)^2 - 3$ and $g(x) = -\frac{1}{2}x^3 + 4$. Explain how you transform graphs of basic functions in order to get the graphs of f and g.





3. (10pts) Write the equation for the function whose graph has the following characteristics:
a) shape of $y = \frac{1}{x}$, shifted up 4 units
b) shape of $y = \sqrt{x}$ shifted left 2 units, then stretched vertically by factor 3
c) shape of $y = x^2$, stretched horizontally by factor 2, then reflected about the x-axis, then shifted right 5 units.

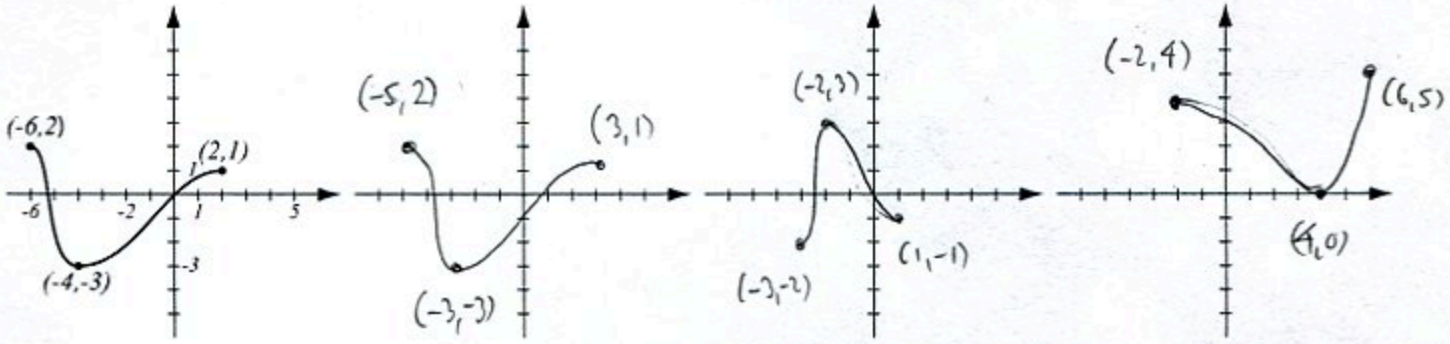
a) $y = \frac{1}{x} + 4$

b) $y = 3\sqrt{x+2}$

c) $y = -\left(\frac{1}{2}(x-5)\right)^2 = -\frac{1}{4}(x-5)^2$

$y = \left(\frac{1}{2}x\right)^2 \rightarrow y = -\left(\frac{1}{2}x\right)^2 \rightarrow y = \left(\frac{1}{2}(x-5)\right)^2$

4. (13pts) The graph of $f(x)$ is drawn below. On three separate graphs, sketch the graphs of the functions $f(x-1)$, $-f(2x)$ and $f(-x)+3$ and label all the relevant points.



shift right 1

stretch horizontally, factor $= \frac{1}{2}$

reflect in x-axis

reflect in y-axis, shift up 3