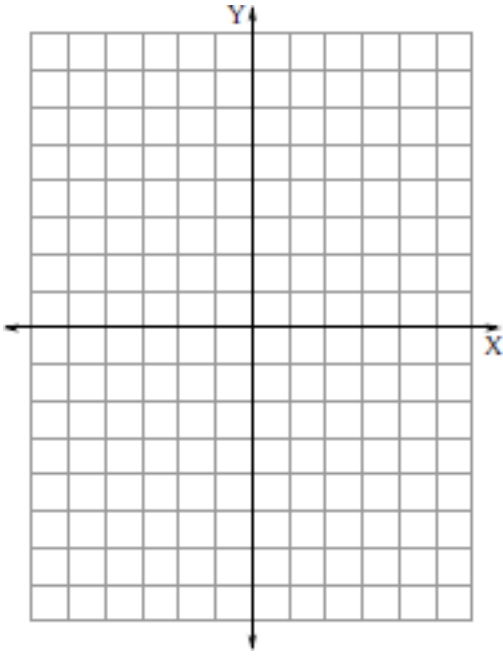


# Worksheet 1: Review of Graphing

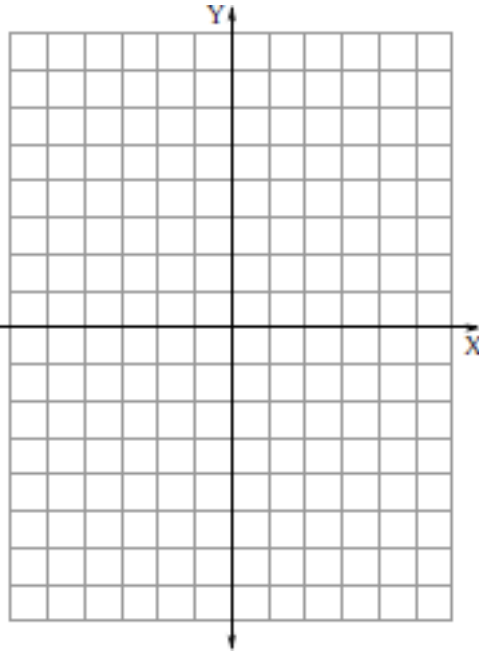
18.01 Fall 2009

**Problem 1.** Graph the following functions.

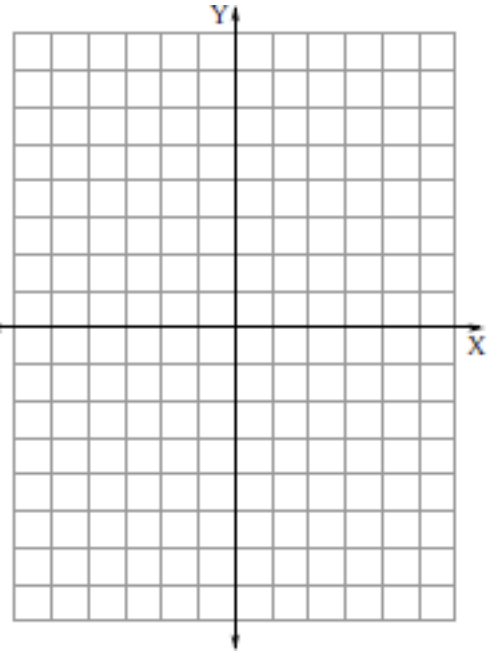
a)  $y = x^2$



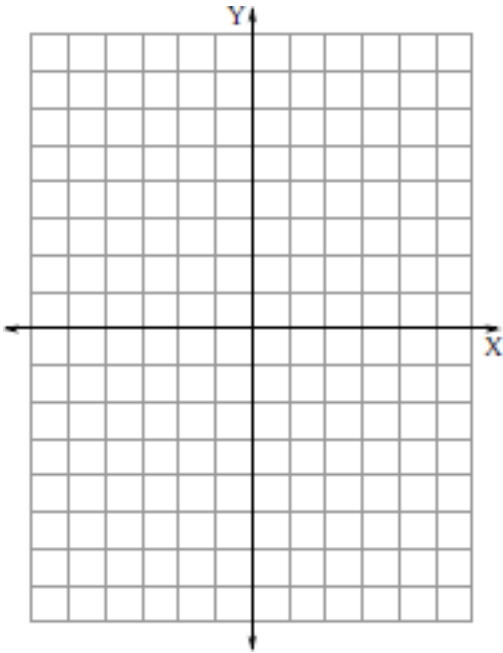
b)  $y = (x + 3)^2$



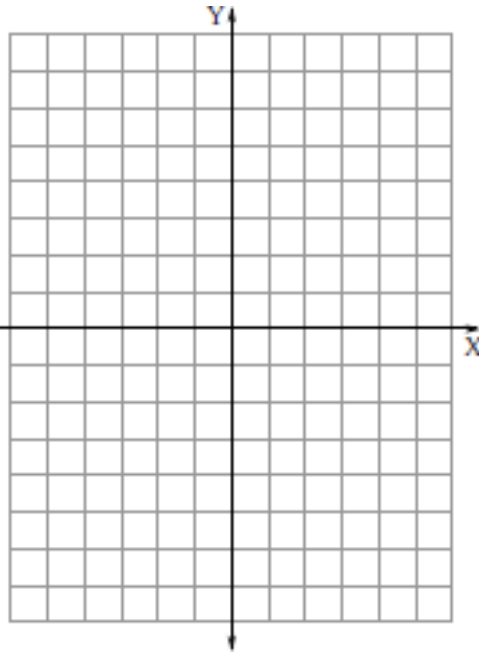
c)  $y + 3 = x^2$



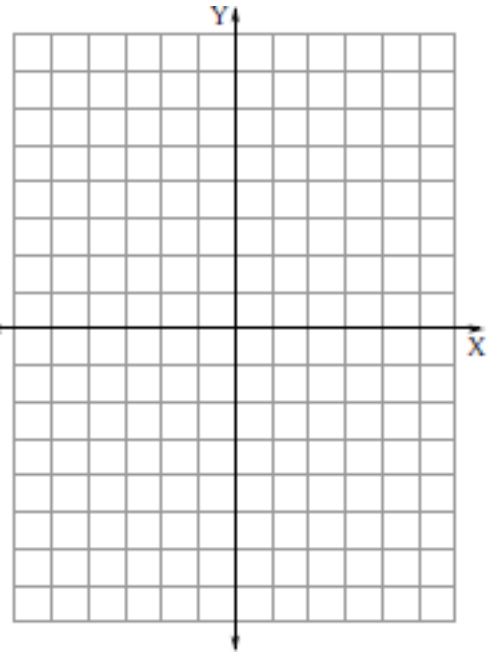
d)  $y = x^2 + 3$



e)  $2y = x^2$



f)  $y = (2x)^2$



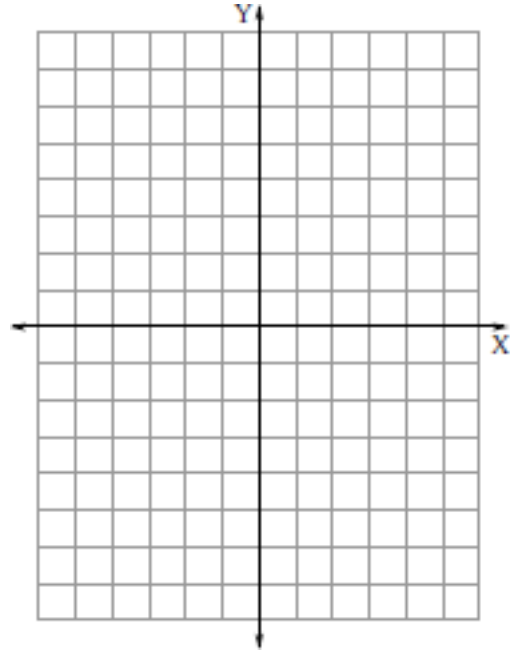
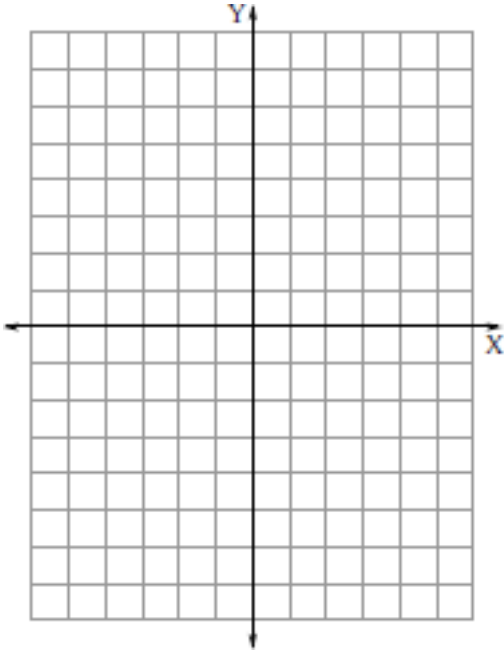
Taking (a) as the base function, identify the transformations performed.

**Problem 2.** a) Graph the following parabolas. Label min/max and zeroes.

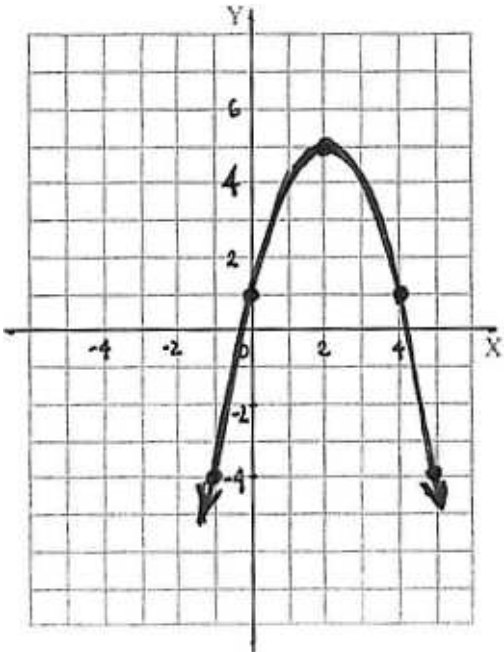
What method can you use to make the second one easier to graph?

$$y = -2(x + 1)^2 + 4$$

$$y = 5 + 12x + 2x^2$$



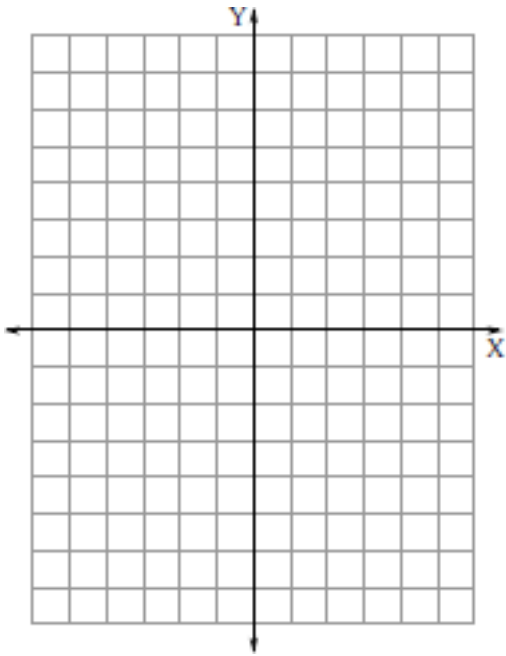
b) Find the equation of the following parabola



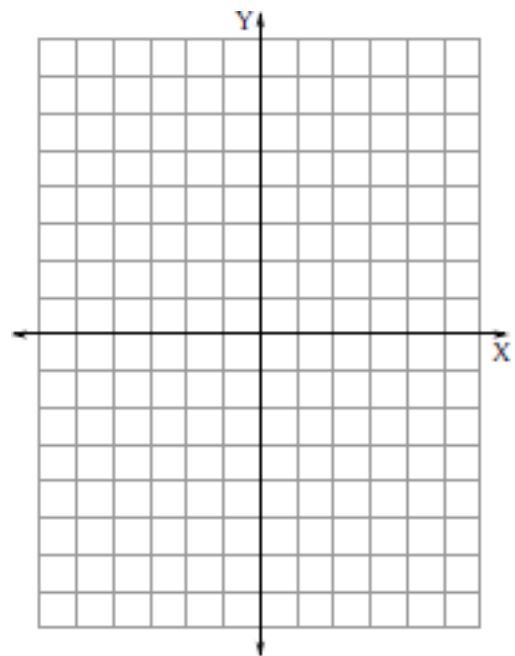
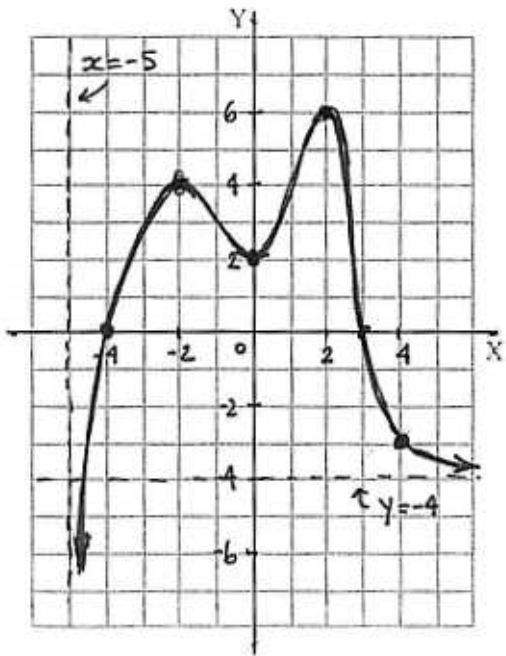
c) Identify the zeroes and (vertical) asymptotes of

$$y = \frac{-2(x-2)^2(x+1)(x+3)}{(x-1)}$$

and do your best to sketch it on the grid below.



**Problem 3.** Given the graph of  $y = g(x)$ , plot  $y = -0.5g(x+2) + 2$  next to it.



**Problem 4.** Milled Ideal Trees converts wooden beams into large rectangular pressed sawdust boards of a uniform thickness for a furniture manufacturer.

Until now, they have always bought cylindrical beams of a certain radius at a fixed cost of \$4.25 per meter.

Because of changes in the beam industry, their raw materials supplier will now only offer narrower beams of  $\frac{3}{4}$ -ths the radius at the slightly lower price of \$4.00 per meter.

To make up for the change in costs of supplies, Milled Ideal Trees will try to make ends meet by selling slightly smaller boards at the same price. Because of furniture industry standards, they have to keep the thickness of each board constant, so they decide to go with a ten percent reduction on each of the other two dimensions.

By what factor does the enterprise's cost of materials per board change if the relative density of wooden beams to pressed boards stays the same?

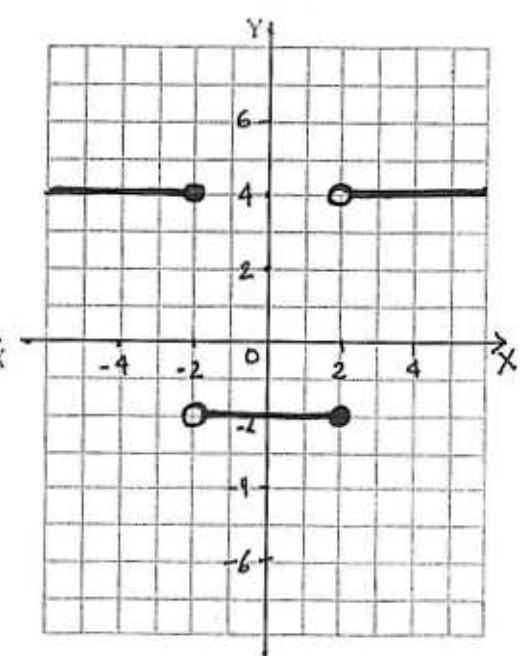
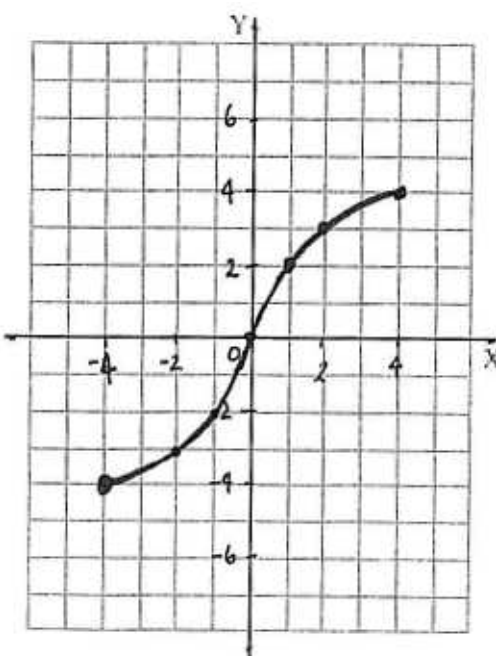
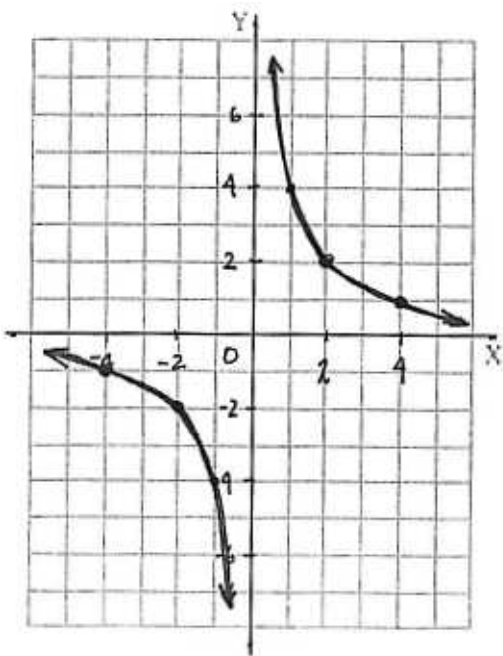
**Problem 5.** You will be given the graphs and equations of some functions.

Identify their symmetry by labeling each as **even**, **odd**, or **neither**

a)

b)

c)



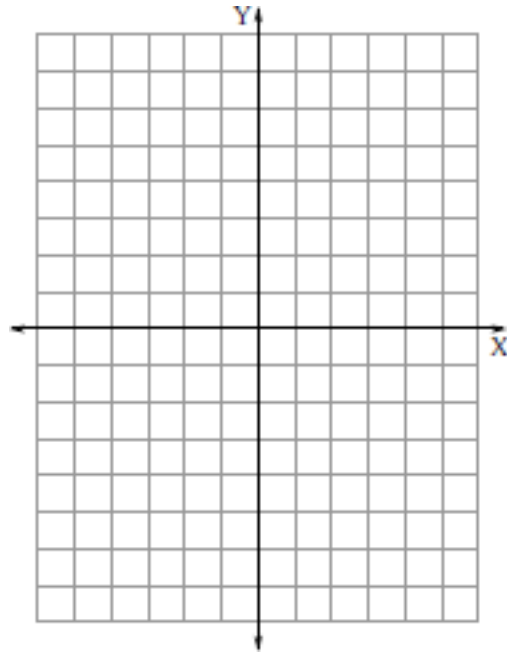
d)  $y = x$

e)  $y = \sin(x) - \pi/2$

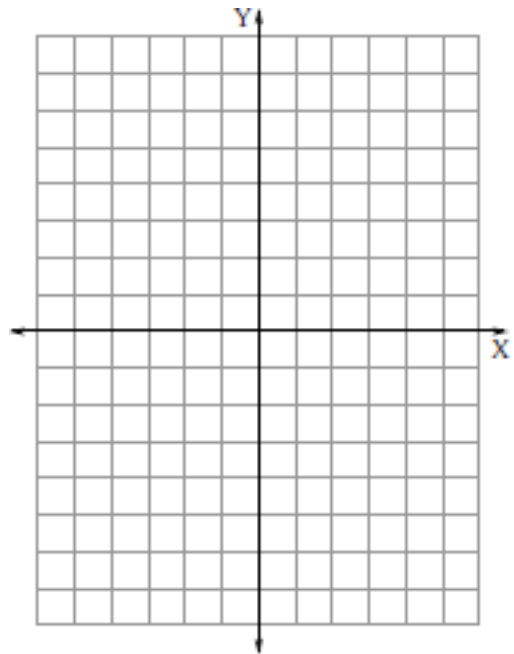
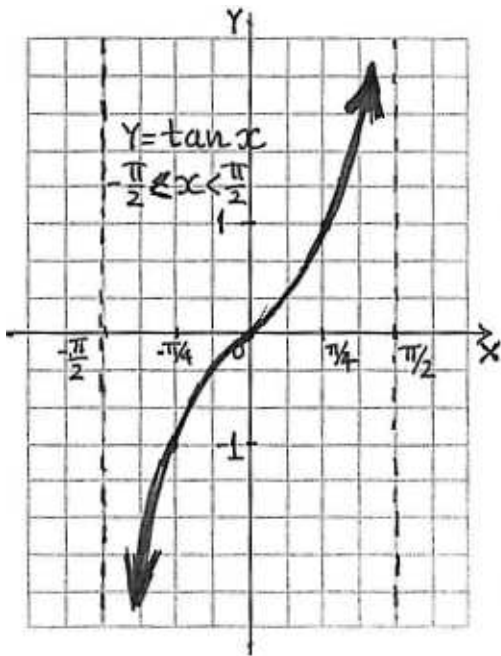
f)  $y = \sin(x - \pi/2)$

g)  $y + 1 = |x|$

**Problem 6.** a) Draw the graph of  $y = x^3 + 1$  reflected through the line  $y = x$ . What is the equation of the resulting function?

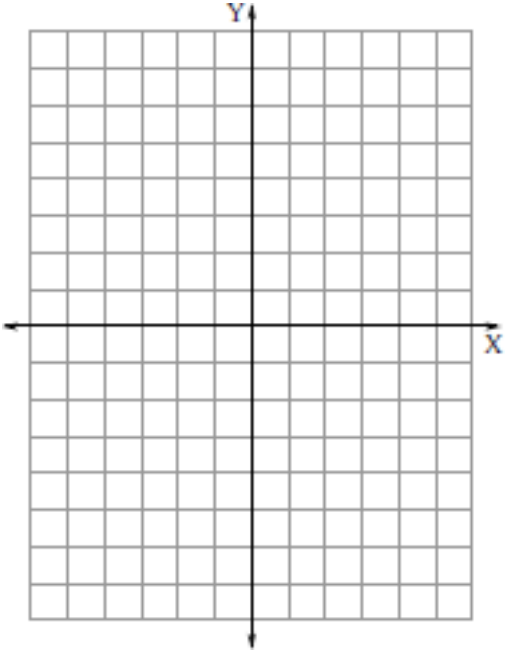


b) Given the graph of  $y = \tan x$  on the domain  $-\pi/2 < x < \pi/2$ , plot  $y = \arctan(x + 3)$ . Label asymptotes.



**Problem 7. Graph**

$$\text{a) } y = \begin{cases} x + 2 & x < 0 \\ 3x^2 + 2 & x \geq 0 \end{cases}$$



$$\text{b) } y = [x + 0.5]$$

