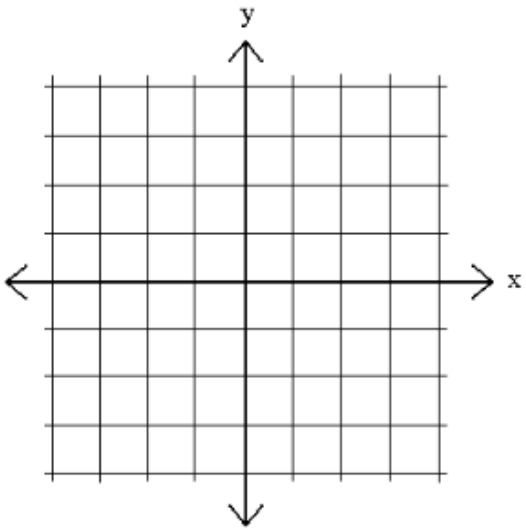
Graphing Systems of Functions Name:_____

Go to Desmos.com and *launch the calculator*.

1. Explore:
   a. Enter $f(x) = (x+3)^2 - 4$ into equation1 Enter $g(x) = -|x+3|+2$ into equation 2

   b. Sketch a picture of the graphs here:

   c. At how many points does $f(x) = g(x)$? _____

   d. State the coordinates of the point(s) where the functions are equal:

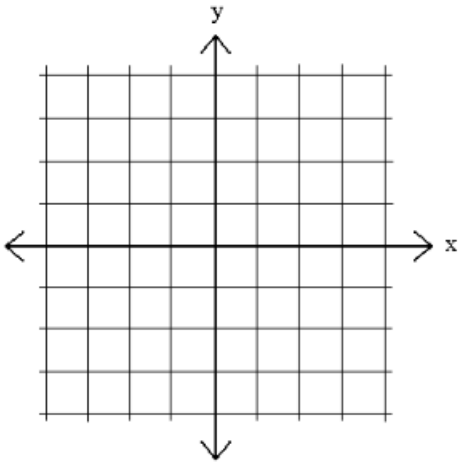
   e. When x = 0, which function is larger? _____

   f. When x = -3 which function is larger? _____

2. Play around with the VERTICAL shift of g(x) until f(x) = g(x) at ONLY ONE POINT!

   a. Write the new equation of g(x)=_____

3. Enter $a(x) = (x-3)^3 + 1$ and $b(x) = |x+2| - 4$
   a. Sketch a picture of your graphs:

   b. At how many points does a(x) = b(x)?

   c. State the coordinates of the points:

   d. When x = 0, which function is greater?

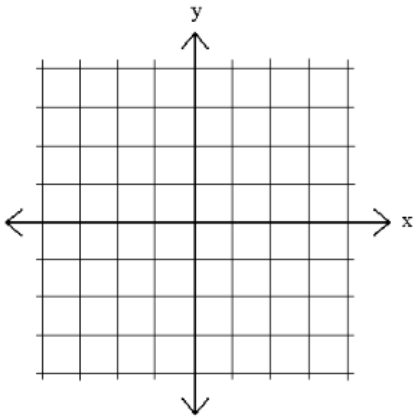
   e. When x = 4, which function is greater?

f. PREDICT: *answer the following questions without graphing!*

i. Explain what will happen if we add a negative sign in BOTH equations:

ii. Will the functions still be equal at the same number of points?

g. Change a(x) and b(x) to have negative coefficients and see if your predictions were right:



4. Create a system of 2 functions m(x) and n(x), one linear and one radical that are equal at (3,3)

m(x) =_____ n(x)=_____

5. Create a systems of 2 functions, p(x) and q(x), one quadratic and one absolute value that are equal at the points (1, -1) AND (4, 3)

p(x) =_____ q(x)=_____

6. Create a systems of 3 functions, a(x), b(x) and c(x), all of different families that intersect at the point (1,1) (that point CANNOT be the vertex)

a(x) =_____

b(x)=_____

c(x)=_____