Transforming Functions take 2

1. Suppose f is a function and $a > 0$. Define functions g and h by

$$g(x) = f(x) + a \quad \text{and} \quad h(x) = f(x + b) - a.$$

Complete the following sentence:
The graph of g is obtained by shifting the graph of f ...

2. The graph of a piece-wise defined function labeled g is below. To be explicit, all the pieces of the graph below make up the graph of g. Note that although the graph of g is disconnected, g passes the vertical line test so it *is* a function.

(a) Find the range of g.
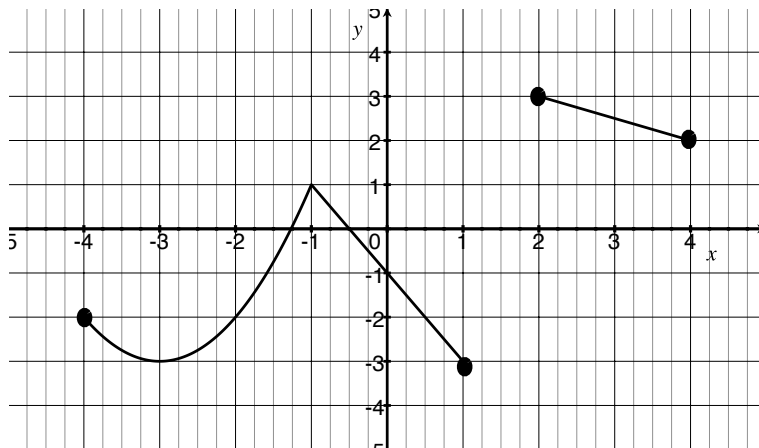
(b) For what value(s) of x does $g(x) = -1$?

(c) Use your answer from Number 4 and draw the graph of $m(x) = g(x - 1) + 2$ on the set of axes.
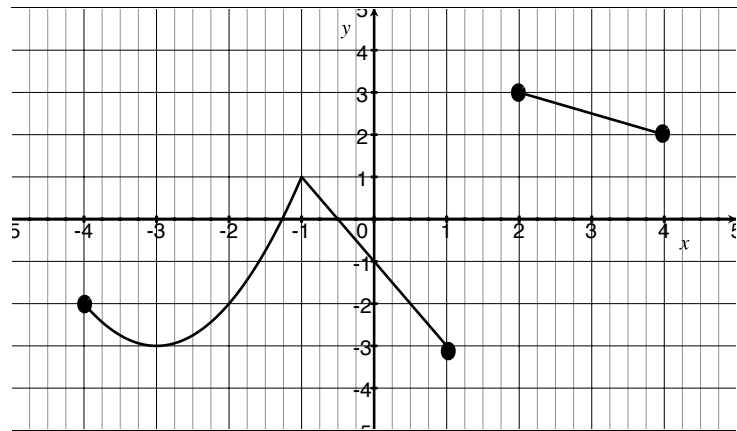
(d) The graph of g is comprised of two line segments and a parabola that has been shifted. Write the rule of g in the form indicated below

$$g(x) = \begin{cases} & \text{if } -4 \le x \le -1 \\ & \text{if } -1 < x \le 1 \\ & \text{if } 2 \le x \le 4 \end{cases}$$

3. Let g again be the piece-wise defined function graphed below.

(a) Identify the steps to transform the graph of g into the graph of $\alpha(x) = -g(x+1)-2$ and then graph α.