1. [11 points] There is information about four different functions below. There is a graph of a function f(x), a piecewise formula for a function g(x), a formula for a function h(x), and a table of some values of an *invertible* function k(x).



**a.** [2 points] Let m(x) = f(x) + 3. Find the range of m(x). You can express your answer using either intervals or inequalities.

Range: [1,5]

- **b.** [2 points] On which of the intervals below is f(x) decreasing on the entire interval? Circle all correct answers.
  - (-3,-1) (-2,0) (0,2) (1,3) NONE
- c. [2 points] Let b(x) be the linear function which is perpendicular to h(x) and which goes through the point (8,3). Find a formula for b(x).

- **d**. [5 points] Find or estimate the value of each of the following; write N/A if a value does not exist or there is not enough information to find it.
  - (i) If w(x) = f(x-3),  $w(1) = \underline{f(-2)} = 2$
  - (ii)  $k^{-1}(4) = -2$
  - (iii) k(h(3)) = k(-2(3-1)+4) = k(-4+4) = k(0) = 1
  - (iv) The average rate of change of g(x) from x = -2 to x = 3.  $\frac{g(3)-g(-2)}{3-(-2)} = \frac{((3-2)^2)-(-(-2))}{5} = \frac{1^2-2}{5} = -\frac{1}{5}$