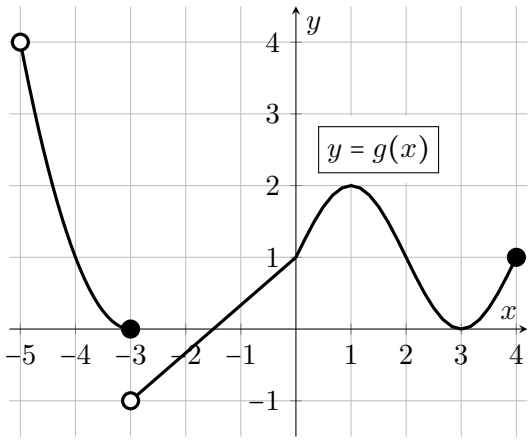
1. [12 points] Consider the following functions:

- $f(x) = 2(x-1) - 5$
- $g(x)$ is given by the graph below.
- Some values of the function $h(x)$, which has an inverse function h^{-1}, are given in the table below.



x	−2	−1	0	1	2
$h(x)$	5	2	−1	−10	0

a. [2 points] Over which of the following intervals does $g(x)$ appear to be concave up on the **entire interval**? *Circle all that apply.*

$(-5,-3]$ $(-3,0)$ $(1,4]$ $(2,4]$ NONE

b. [2 points] Over which of the following intervals does $g(x)$ appear to be increasing on the **entire interval**? *Circle all that apply.*

$(-5,-3]$ $(-3,1)$ $(2,4]$ $(3,4]$ NONE

c. [2 points] Give a formula for a linear function $w(x)$ whose graph is perpendicular to the graph of $f(x)$ and goes through the point $(3,-2)$.

$w(x) =$ $-\frac{1}{2}(x-3) - 2$

d. [6 points] Find the value of the following quantities, where possible. Write N/A if they cannot be determined or do not exist.

(i) $f^{-1}(9) =$ 8

(ii) $f(g(-3)) =$ −7

(iii) $h^{-1}(g(3)) =$ 2

(iv) If $w(x) = g(x-1) - 3$, $w(2) =$ −1

(v) All x such that $g(x) = 1$: $x =$ $-4, 0, 2, 4$