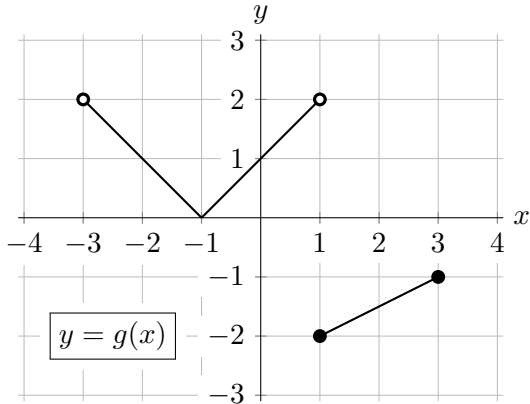


1. [7 points] The entire graph of a function  $g(x)$  is shown below to the left. Also shown is a table of some values for a different function  $h(x)$ . Assume that the function  $h(x)$  is invertible.



$x$	-3	-1	0	1	3	4
$h(x)$	7	5	3	0	-2	-3

- a. [3 points] Find the domain of  $g(x)$  and range of  $g(x)$ . Give your answers using interval notation or using inequalities. *You do not need to explain or justify your answer.*

**Answer:**  $g(x)$  has domain  $(-3, 3]$  and range  $[-2, -1] \cup [0, 2]$

- b. [4 points] Find each of the following, or write N/A if a value does not exist or there is not enough information to find it. *You do not need to show work.*

i.  $h^{-1}(-3)$

**Answer:**  $h^{-1}(-3) =$  4

ii.  $g(h(0))$

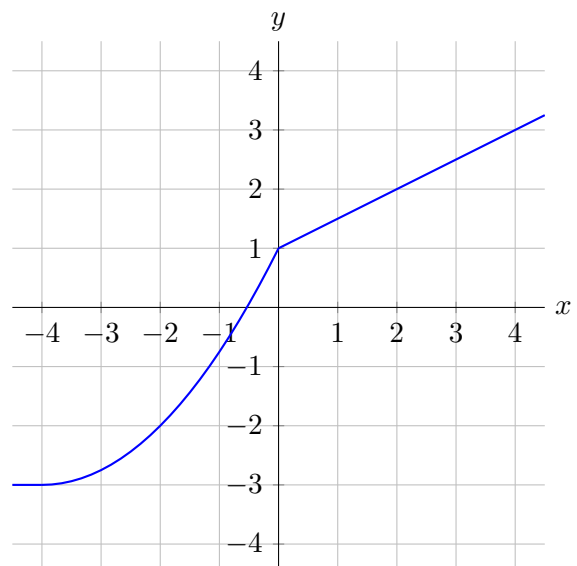
**Answer:**  $g(h(0)) =$  -1

iii. all values of  $x$  so that  $g(h(x)) = 1$

**Answer:**  $x =$  1, 3

2. [5 points] On the axes below, sketch the graph of a single possible function  $y = f(x)$  satisfying all the listed properties.

- $f(0) = 1$
- the average rate of change of  $f(x)$  on  $[-4, 0]$  is 1
- $f(x)$  is concave up for  $-4 < x < 0$
- $f(x)$  is invertible (that is, it has an inverse)
- $f(x)$  has a constant rate of change for  $0 < x < 4$



**Solution:** One possible graph is shown.