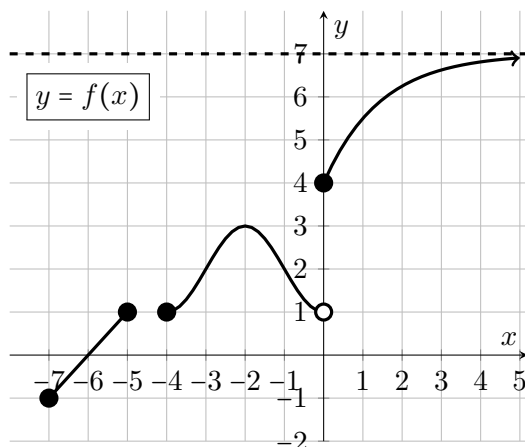


1. [9 points] Part of the graph of a function $f(x)$ is shown below to the left; note that it has a **horizontal asymptote of $y = 7$** . Also shown is a table of some values for an invertible function $g(x)$, and formula for a function $h(x)$.



| | | | | | | |
|--------|----|----|----|---|---|---|
| x | -5 | -2 | -1 | 0 | 1 | 2 |
| $g(x)$ | 6 | -5 | 0 | 4 | 7 | 9 |

$$h(x) = \begin{cases} x^2 + 1, & 0 \leq x < \infty \\ x + 1, & -\infty < x < 0 \end{cases}$$

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

Domain: $[-7, -5] \cup [-4, \infty]$

Range: $[-1, 3] \cup [4, 7)$

- b. [6 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.

You do not need to show work.

(i) $g(f(-1)) = g(2) = 9$

(ii) $f(g^{-1}(-5)) = f(-2) = 3$

(iii) $h^{-1}(-5) = -6$

(iv) $g(h(-2)) = g(-2+1) = g(-1) = 0$

(v) $\lim_{x \rightarrow \infty} f(x) = 7$

(vi) If $q(x) = g(x-3) + 2$, $q(2) = g(2-3) + 2 = g(-1) + 2 = 0 + 2 = 2$