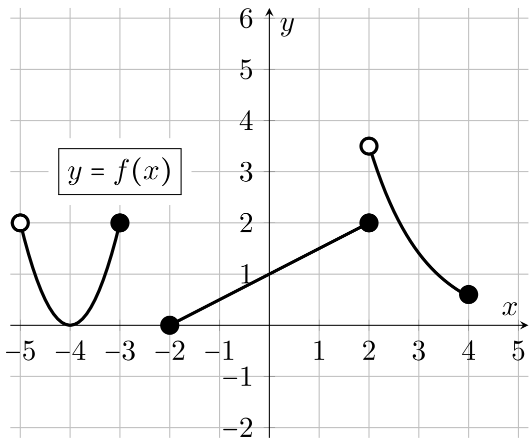
1. [9 points] The entire graph of a function $f(x)$ is shown below to the left. Also shown is a table of some values for an invertible function $g(x)$, and formula for a function $h(x)$.



x	-3	-2	-0.5	0	1	2
$g(x)$	6	-5	0	4	7	9

$$h(x) = \begin{cases} \dfrac{1}{x}, & -\infty < x < 0 \\ \cos(\pi x), & 0 \le x < \infty \end{cases}$$

a. [2 points] Find the **domain** of $f(x)$. Give your answers using interval notation or using inequalities. *You do not need to explain or justify your answer.*

Domain: $(-5,-3] \cup [-2,4]$

b. [2 points] Find the **range** of $h(x)$ (the function given by a **formula**). Give your answers using interval notation or using inequalities. *Show all work, including any computations or graph sketches.*

Solution: For negative values of x, the range of $h(x)$ will be $(-\infty, 0)$. For positive values of x, the range of $h(x)$ will be $[-1, 1]$. Putting those together, we get $(-\infty, 1]$.

Range: $(-\infty, 1]$

c. [5 points] Find 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. *Showing work is not required, but may make you eligible for partial credit in some cases.*

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

(ii) $h(g^{-1}(0)) =$ $h(-0.5) = \frac{1}{-0.5} = -2$

(iii) All x such that $h(x) = -5$, $x =$ $-\frac{1}{5}$

(iv) $g(h(2)) =$ $g(\cos(2\pi)) = g(1) = 7$

(v) If $q(x) = \frac{2}{3}f(x-2)$, then $q(-1) =$ $\frac{2}{3}f(-1-2) = \frac{2}{3}f(-3) = \frac{2}{3} \times 2 = \frac{4}{3}$