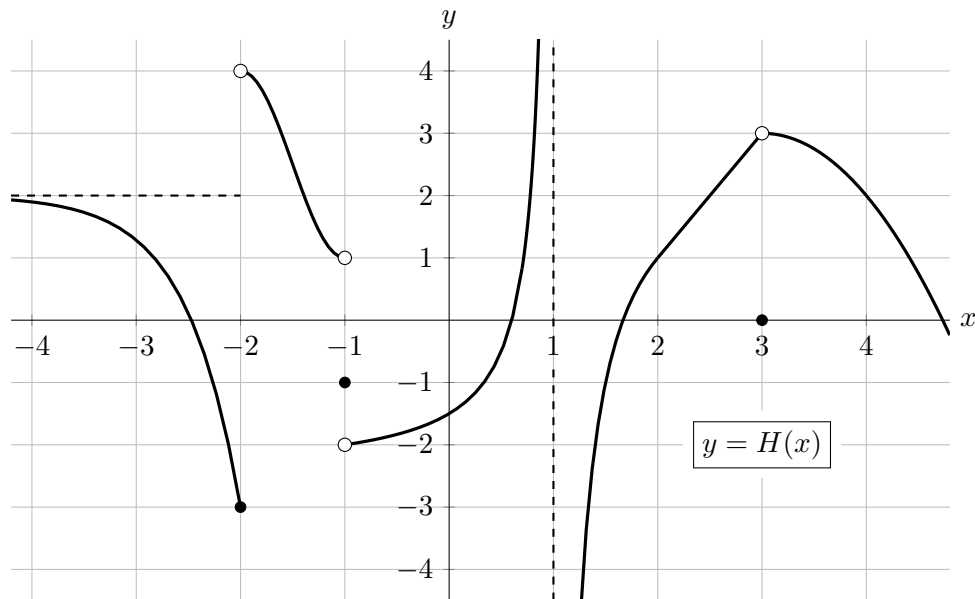


5. [11 points] Below is a portion of the graph of the function $H(x)$, which is defined for all $x < 1$ and all $x > 1$. Note that $H(x)$ is linear for $2 \leq x < 3$, and that $H(x)$ has a horizontal asymptote at $y = 2$ and a vertical asymptote at $x = 1$.



Use this graph to find the numerical value of each of the following limits. If a limit does not exist, including if it diverges to $\pm\infty$, write DNE. You do not need to show work.

a. [1 point] $\lim_{x \rightarrow -2} H(x)$

Answer: DNE

b. [1 point] $\lim_{x \rightarrow 3} H(x)$

Answer: 3

c. [1 point] $\lim_{x \rightarrow -\infty} H(x)$

Answer: 2

d. [2 points] $\lim_{x \rightarrow 4^+} H(3 - x)$

Answer: 1

e. [2 points] $\lim_{h \rightarrow 0} \frac{H(2.5 + h) - H(2.5)}{h}$

Answer: 2

Define the function $J(x) = 3H(-2x) - 1$. You do not need to show work in the next two parts.

f. [2 points] Where does the function $J(x)$ have a vertical asymptote? At $x = \underline{-1/2}$.

g. [2 points] Where does the function $J(x)$ have a horizontal asymptote? At $y = \underline{5}$.