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] $\lim_{x \to -2} H(x)$
- **b.** [1 point] $\lim_{x \to 3} H(x)$
- **c.** [1 point] $\lim_{x \to -\infty} H(x)$
- **d.** [2 points] $\lim_{x \to 4^+} H(3 - x)$
- **e.** [2 points] $\lim_{h \to 0} \frac{H(2.5 + h) - H(2.5)}{h}$

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 $x = \_\_\_\_$.
- **g.** [2 points] Where does the function $J(x)$ have a horizontal asymptote? At $y = \_\_\_\_$. 