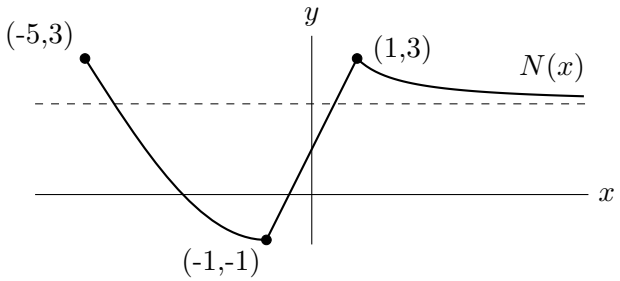
7. [14 points] Consider the graph of the function $N(x)$ and the formula for the function $L(t)$ represented below. $N(x)$ is linear on $[-1, 1]$, and the dotted line is a horizontal asymptote of $N(x)$ at $y = 2$. You do not need to show your work for this problem.



$$L(t) = \begin{cases} \frac{-8(t+2)(t+1)}{t^2+4} & \text{for } t < 0 \\ \\ \frac{9(t-4)}{t^2-9} & \text{for } t \geq 0 \end{cases}$$

a. [6 points] Find the following (write "DNE" if the quantity does not exist):

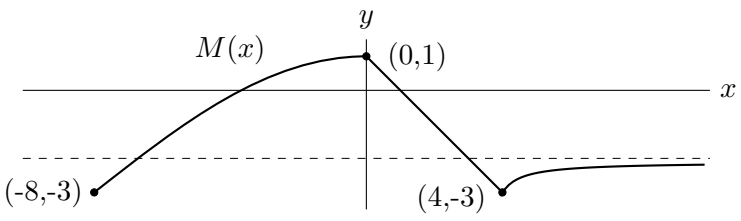
- $L(N(-1)) =$ 0.
- $N(L(5)) =$ $1 + \frac{18}{16}$.
- $\lim_{t\to\infty} L(t) =$ 0.
- $\lim_{t\to-\infty} L(t) =$ -8.
- $\lim_{x\to\infty} N(x) =$ 2.
- The average rate of change of $N(x)$ between $x = -5$ and $x = 0$ is -2/5.

b. [5 points] Find all vertical asymptotes and zeros of $L(t)$. If there are none, write "none" in the corresponding blank

The vertical asymptote(s) of $L(t)$ is/are $t = 3$.

The zero(s) of $L(t)$ is/are $t = 4, -1, -2$.

c. [3 points] Find a formula for $M(x)$, graphed below, as a transformation of $N(x)$.



$M(x) =$ $-N(\frac{1}{2}(x-1))$.