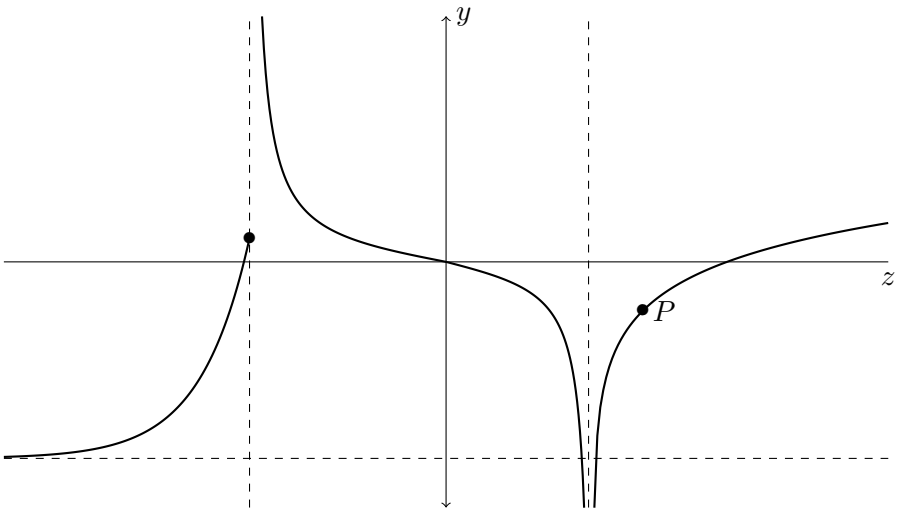
6. [10 points] Below is a graph of the function $S(z)$. The function has a horizontal asymptote at $y = -4$, and vertical asymptotes at $z = -4$ and $z = 3$. The point P is located at the coordinates $(4, -1)$.



a. [4 points] For $z > 3$, the formula for $S(z)$ is of the form $\log(z - h) + k$. In exact form, find the values of h and k using the fact that $P = (4, -1)$ and the fact that $z = 3$ is a vertical asymptote of $S(z)$.

$h =$ _____

$k =$ _____

Let $T(z) = 3S(-0.5(z - 3)) - 8$.

Note: The next two parts of this problem are about $T(z)$, not about the original function!

b. [4 points] Find the vertical asymptote(s) of $T(z)$. Circle your answer(s).

c. [2 points] Find $\lim_{z \to \infty} T(z)$.

$\lim_{z \to \infty} T(z) =$ _____