5.

It so happens that this function can be simplified as:

$$k(t) = \frac{-125+t^3}{-5-4t+t^2}$$

$$= \frac{(t-5)\left(t^2+5t+25\right)}{(t-5)(t+1)}$$

$$= \frac{t^2+5t+25}{t+1}$$

To find the vertical asymptote :

$t+1=0$

$t=-1$

There is a vertical asymptote at $t=-1$

To find the horizontal asymptote :

First we must compare the degrees of the polynomials.

The numerator contains a 3^{rd} degree polynomial while the denominator contains a 2^{nd} degree polynomial.

Since the polynomial in the numerator is a higher degree than the denominator, there is no horizontal asymptote.

To find the oblique asymptote :

we must divide the numerator by the denominator $\frac{-125+t^3}{-5-4t+t^2} = \frac{t^2+5t+25}{t+1} = \frac{21}{t+1} + (t+4)$

There is an oblique asymptote at $e=t+4$