5.

It so happens that this function can be simplified as:

$d(t) = \frac{-64+t^3}{-4-3t+t^2}$

$= \frac{(t-4)\left(t^2+4t+16\right)}{(t-4)(t+1)}$

$= \frac{t^2+4t+16}{t+1}$

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 $\frac{-64+t^3}{-4-3t+t^2} = \frac{t^2+4t+16}{t+1} = \frac{13}{t+1} + (t+3)$

There is an oblique asymptote at $n=t+3$