1.

It so happens that this function can be simplified as:

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

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

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

To find the vertical asymptote :

$w+1=0$

$w=-1$

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

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 $\frac{-125+w^3}{-5-4w+w^2} = \frac{w^2+5w+25}{w+1} = \frac{21}{w+1} + (w+4)$

There is an oblique asymptote at $a=w+4$