5.

It so happens that this function can be simplified as:

$$v(w) = \frac{-8+w^3}{-8+2w+w^2}$$

$$= \frac{(w-2)\left(w^2+2w+4\right)}{(w-2)\ (w+4)}$$

$$= \frac{w^2+2w+4}{w+4}$$

To find the vertical asymptote :

$w+4=0$

$w=-4$

There is a vertical asymptote at $w=-4$

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 $\frac{-8+w^3}{-8+2w+w^2} = \frac{w^2+2w+4}{w+4} = \frac{12}{w+4} + (w-2)$

There is an oblique asymptote at $z=w-2$