

4.

It so happens that this function can be simplified as:

$$\begin{aligned} p(w) &= \frac{-8+w^3}{-6+w+w^2} \\ &= \frac{(w-2)(w^2+2w+4)}{(w-2)(w+3)} \\ &= \frac{w^2+2w+4}{w+3} \end{aligned}$$

To find the vertical asymptote :

$$w+3=0$$

$$w=-3$$

There is a vertical asymptote at $w=-3$

To find the horizontal asymptote :

First we must compare the degrees of the polynomials.

The numerator contains a 3rd degree polynomial while the

denominator contains a 2nd 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 $\frac{-8+w^3}{-6+w+w^2} = \frac{w^2+2w+4}{w+3} = \frac{7}{w+3} + (w-1)$

There is an oblique asymptote at $r=w-1$

