

4.

To find the vertical asymptote :

We must set the denominator equal to 0 and solve:

$$f^4 - 1 = 0$$

$$(f^2 - 1)(f^2 + 1) = 0$$

$$(f^2 - 1) = 0$$

$$(f - 1)(f + 1) = 0$$

$$f = 1 \text{ or } f = -1$$

There is vertical asymptote at $f=1$ and at $f=-1$

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 4th degree polynomial.

Since the polynomial in the numerator is a lower degree than the denominator, the horizontal asymptote is located at $j=0$.

To find the oblique asymptote :

Since the degrees of the numerator are less than the degrees of the denominator, this rational does not have an oblique asymptote

