

5.

To find the vertical asymptote :

We must set the denominator equal to 0 and solve:

$$s^4 - 1 = 0$$

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

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

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

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

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

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 $e = 0$.

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

