

2.

To find the vertical asymptote :

We must set the denominator equal to 0 and solve:

$$a^4 - 81 = 0$$

$$(a^2 - 9)(a^2 + 9) = 0$$

$$(a^2 - 9) = 0$$

$$(a - 3)(a + 3) = 0$$

$$a = 3 \text{ or } a = -3$$

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

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 4th degree polynomial.

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

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

