

4.

To find the vertical asymptote :

We must set the denominator equal to 0 and solve:

$$q^3 - 64 = 0$$

$$q = 4$$

There is a vertical asymptote at $q=4$

To find the horizontal asymptote :

First we must compare the degrees of the polynomials.

The numerator contains a 2nd degree polynomial while

the denominator contains a 3rd degree polynomial.

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

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

