2.

It so happens that this function can be simplified as:

$g(q) = \frac{-64+q^3}{-16+q^2}$

$= \frac{(q-4)\left(q^2+4q+16\right)}{(q-4)(q+4)}$

$= \frac{q^2+4q+16}{q+4}$

To find the vertical asymptote :

$q+4=0$

$q=-4$

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 3^{rd} degree polynomial while the denominator contains a 2^{nd} 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 $\frac{-64+q^3}{-16+q^2} = \frac{q^2+4q+16}{q+4} = \frac{16}{q+4} + q$

There is an oblique asymptote at $b=q$