

5.

It so happens that this function can be simplified as:

$$\begin{aligned} e(g) &= \frac{-27+g^3}{-9+g^2} \\ &= \frac{(g-3)(g^2+3g+9)}{(g-3)(g+3)} \\ &= \frac{g^2+3g+9}{g+3} \end{aligned}$$

To find the vertical asymptote :

$$g+3=0$$

$$g=-3$$

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

To find the horizontal asymptote :

First we must compare the degrees of the polynomials.

The numerator contains a 3<sup>rd</sup> degree polynomial while the

denominator contains a 2<sup>nd</sup> 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  $\frac{-27+g^3}{-9+g^2} = \frac{g^2+3g+9}{g+3} = \frac{9}{g+3} + g$

There is an oblique asymptote at  $k=g$

