

3.

To find the vertical asymptote :

We must set the denominator equal to 0 and solve:

$$p^4 - 16 = 0$$

$$(p^2 - 4)(p^2 + 4) = 0$$

$$(p^2 - 4) = 0$$

$$(p - 2)(p + 2) = 0$$

$$p = 2 \text{ or } p = -2$$

There is vertical asymptote at  $p = 2$  and at  $p = -2$

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 4<sup>th</sup> degree polynomial.

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

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

