3.1

index

radical

radicand - cannot be negative if the index is even

- cannot be undefined

For example, if

then must be greater than zero because the radicand cannot be negative if the index is even and the denominator cannot be zero

that is

3.2 Two ways to solve a radical equation:

1. Graphically- set and find the roots or set and find the x-coordinate of the point(s) of intersection.
2. Algebraically – use the power theorem, check your answer(s), eliminate extraneous roots (if any).

See page 123-125 for examples of both.

3.3 Rational functions have the form , where and are polynomials and .

* **vertical asymptotes** – determined by the zeroes of
* **horizontal asymptotes** – 3 cases

1. if the degree of the polynomial in the numerator is LESS THAN the degree of the polynomial in the denominator then the *horizontal asymptote* is the X-AXIS.
2. if the degree of the polynomial in the numerator is EQUAL TO the degree of the polynomial in the denominator then the *horizontal asymptote* is the RATIO OF THE LEADING COEFFICIENTS.
3. if the degree of the polynomial in the numerator is GREATER THAN the degree of the polynomial in the denominator then there is no *horizontal asymptote*.

* **x-intercepts** occur where …. *They have coordinates .*

*To determine the x-intercept(s), simply let and solve the equation for x.*

* **y-intercepts** *occur where …. They have coordinates .*

*To determine the y-intercept, simply let and solve the equation for y.*

* **holes** in the graphs of rational functions occur when the factors of the polynomials cancel out in the numerator and denominator (see p. 133 for an example).

3.4 Graphing Rational Functions , where and .

A six step process:

1. find any vertical asymptotes.
2. find any horizontal asymptotes.
3. find the x- and y-intercepts, if they exist.
4. identify the coordinates of any holes, if they exist
5. create a table of values (choose x values close to the vertical asymptote(s) and to the far left and far right of the graph)
6. connect the dots forming a smooth curve