Another conic section is the hyperbola.

**Hyperbola with the Transverse Axis Parallel to the x-axis**

**Standard Form for the Equation of a Hyperbola:**

\[
\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1
\]
Hyperbola with the Transverse Axis Parallel to the $y$-axis

Standard Form for the Equation of a Hyperbola:
There is also a general form of the equation of a hyperbola.

**General Form for the Equation of a Hyperbola.**

\[
\frac{x^2}{A} - \frac{y^2}{C} = 1
\]

where \( A \neq 0 \), \( C \neq 0 \) and \( A \) and \( C \) have different signs.

Ex. find the coordinates of the center, the foci and the vertices and the equations of the asymptotes of the hyperbola with the equation \( 25y^2 - 9x^2 - 100y - 72x - 269 = 0 \).

1. Group the like terms together and move the constant to the other side of the equation.

2. Factor out the greatest common coefficient of the x-squared and y-squared terms.

3. Complete the squares. Be careful about what you add to the other side of the equation! Remember that the number you are adding inside of the parenthesis is being multiplied by a number outside the parenthesis.

4. Factor the perfect squares.

5. Divide the whole equation by the constant on the right side of the equation and reduce the fractions.

   center:__________

   foci:______________
vertices: ______________
equations of the asymptotes: ____________________________