Answer on Question 40061, Math, Analytic Geometry Question: how to reduce 2xsquared-3ysquare-6x+12y to standard form of a hyperbola.
Solution. First let us find the discriminant of the conic section Δ. If the equation is

$$A_{xx}x^2 + 2A_{xy}xy + A_{yy}y^2 + 2B_x x + 2B_y y + C = 0$$

Then, it is defined as:

$$\Delta := \begin{vmatrix} A_{xx} & A_{xy} & B_x \\ A_{xy} & A_{yy} & B_y \\ B_x & B_y & C \end{vmatrix}$$

In our case

$$\Delta = \begin{vmatrix} 2 & 0 & -3 \\ 0 & -3 & 6 \\ -3 & 6 & 0 \end{vmatrix} = -45$$

Next we must find roots of quadratic equation

$$\lambda^2 - (A_{xx} + A_{yy})\lambda + D = 0$$

where D is determinant

$$D = \begin{vmatrix} 2 & 0 \\ 0 & -3 \end{vmatrix} = -6$$

$$\lambda^2 - \lambda - 6 = 0$$

Roots are $\lambda_1 = 3, \lambda_2 = -2$ So, the a and b of the canonical form

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

can be found as

$$a^2 = -\frac{\Delta}{\lambda_1^2\lambda_2}, \qquad b^2 = \frac{\Delta}{\lambda_1\lambda_2^2}$$

$$a = 5/2, \quad b = 15/4$$

The canonical form is

$$\frac{x^2}{5/2} - \frac{y^2}{15/4} = 1$$