

Answer on Question #64857 – Math – Linear Algebra

Question

Reduce the conic $x^2 - 6xy + y^2 - 4 = 0$ to standard form. Hence the given conic.

Solution

$$x^2 - 6xy + y^2 - 4 = 0 \Rightarrow (x^2 - 6xy + 9y^2) - 9y^2 + y^2 - 4 = 0 \Rightarrow (x - 3y)^2 - 8y^2 - 4 = 0.$$

Now we have

$$(x - 3y)^2 - 8y^2 = 4. \quad (1)$$

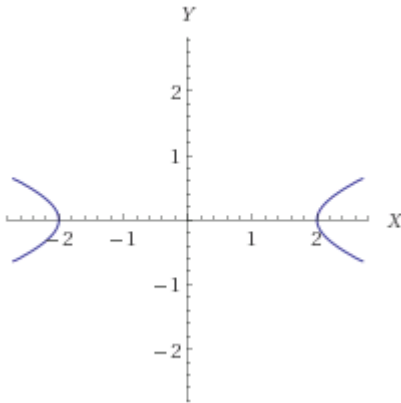
Substituting $X = x - 3y$ and $Y = y$ into (1) we will obtain the following equation:

$$X^2 - 8Y^2 = 4$$

Dividing by 4

$$\frac{X^2}{4} - \frac{Y^2}{\frac{1}{2}} = 1.$$

This is a canonical equation of hyperbola.



Answer: $\frac{X^2}{4} - \frac{Y^2}{\frac{1}{2}} = 1$; the given conic is hyperbola.