

Answer on Question #45090 – Math - Analytic Geometry

Problem.

Find the points of intersection of the conics $x^2/4 - y^2/9 = 1$ and $x^2/6 + y^2/9 = 1$.

Solution.

The points of intersection of the conics is the solution of the system

$$\begin{cases} \frac{x^2}{4} - \frac{y^2}{9} = 1; \\ \frac{x^2}{6} + \frac{y^2}{9} = 1. \end{cases}$$

The system is equivalent to

$$\begin{cases} \frac{x^2}{4} - \frac{y^2}{9} = 1; \\ \left(\frac{x^2}{6} + \frac{y^2}{9}\right) + \left(\frac{x^2}{4} - \frac{y^2}{9}\right) = 1 + 1; \end{cases}$$

or

$$\begin{cases} \frac{x^2}{4} - \frac{y^2}{9} = 1; \\ \frac{x^2}{6} + \frac{x^2}{4} = 2; \end{cases}$$

Then $x^2 = 4.8$ and $y^2 = 1.8$.

Hence the points of intersection are $(-\sqrt{4.8}, -\sqrt{1.8})$, $(-\sqrt{4.8}, \sqrt{1.8})$, $(\sqrt{4.8}, -\sqrt{1.8})$, $(\sqrt{4.8}, \sqrt{1.8})$.

Answer: $(-\sqrt{4.8}, -\sqrt{1.8})$, $(-\sqrt{4.8}, \sqrt{1.8})$, $(\sqrt{4.8}, -\sqrt{1.8})$, $(\sqrt{4.8}, \sqrt{1.8})$.