

REDUÇÃO DE CÔNICAS

Reducir a cônica

$$\frac{x}{2} - \frac{x}{\sqrt{3}} + \frac{7x^2}{48} - \frac{y}{3} - \frac{\sqrt{3}y}{2} - \frac{5xy}{24\sqrt{3}} + \frac{31y^2}{144} = -1$$

à forma canônica, achar vértices e centro.

RES

$$\begin{array}{c|c|c} \widetilde{A} = \frac{7}{48} & \widetilde{B} = -\frac{5}{24\sqrt{3}} & \widetilde{C} = \frac{31}{144} \\ \hline \hline \widetilde{A} = \frac{21}{144} & \widetilde{B} = -\frac{10\sqrt{3}}{144} & \widetilde{C} = \frac{31}{144} \end{array}$$

$$\tan \alpha = \frac{\widetilde{C} - \widetilde{A} \pm \sqrt{(\widetilde{C} - \widetilde{A})^2 + \widetilde{B}^2}}{\widetilde{B}} \Rightarrow \tan \alpha = \frac{10 \pm \sqrt{100 + 300}}{-10\sqrt{3}} = \begin{cases} -\sqrt{3} \\ \frac{1}{\sqrt{3}} \end{cases} \Leftrightarrow \begin{cases} \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \end{cases}$$

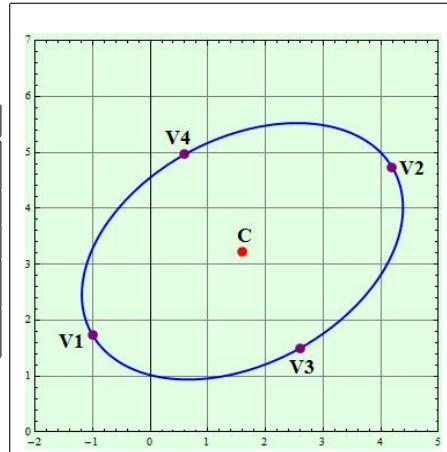
$$\sin \alpha = \frac{\tan \alpha}{\sqrt{1 + \tan^2 \alpha}} = \frac{1}{2} \quad \bullet \quad \cos \alpha = \frac{1}{\sqrt{1 + \tan^2 \alpha}} = \frac{\sqrt{3}}{2}$$

$$x = X \cos \alpha - Y \sin \alpha = \frac{X \sqrt{3} - Y}{2} \quad \bullet \quad y = X \sin \alpha + Y \cos \alpha = \frac{X + Y \sqrt{3}}{2}$$

$$\downarrow \\ \frac{1}{9}X^2 - \frac{2}{3}X + \frac{1}{4}Y^2 - Y = -1$$

$$\downarrow \\ \frac{(X-3)^2}{9} + \frac{(Y-2)^2}{4} = 1$$

↓



	(X, Y)	(x, y)
C	$(3, 2)$	$\left(-1 + \frac{3\sqrt{3}}{2}, \frac{3}{2} + \sqrt{3}\right)$
V_1	$(0, 2)$	$(-1, \sqrt{3})$
V_2	$(6, 2)$	$(-1 + 3\sqrt{3}, 3 + \sqrt{3})$
V_3	$(3, 0)$	$\left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$
V_4	$(3, 4)$	$\left(-2 + \frac{3\sqrt{3}}{2}, \frac{3}{2} + 2\sqrt{3}\right)$