In[●]:= `ContourPlot[ 4 x^2 + 2 y^2 - 2 x y + x - 3 y - 3 == 0, {x, -3, 3}, {y, -3, 3}]`
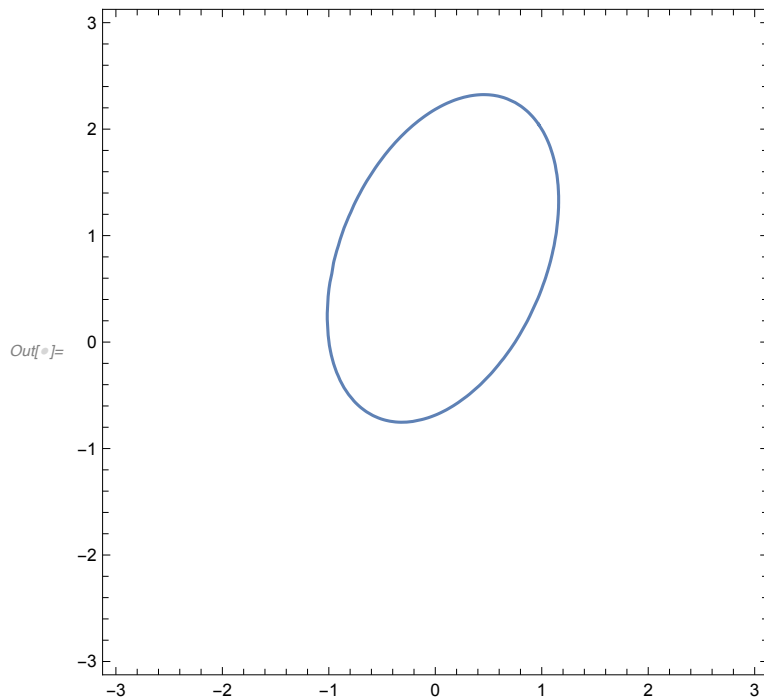 └representación de contornos

Out[●]=

In[62]:= `mm := {{-3, 1/2, -3/2}, {1/2, 4, -1}, {-3/2, -1, 2}}`

  `m := {{4, -1}, {-1, 2}}`

In[●]:= `CharacteristicPolynomial[mm, x]`
  └polinomio característico

  `CharacteristicPolynomial[m, x]`
  └polinomio característico

  `Eigenvalues[m]`
  └autovalores

  `Eigenvectors[m]`
  └autovectores

Out[●]= $-29 + \dfrac{27\,x}{2} + 3\,x^2 - x^3$

Out[●]= $7 - 6\,x + x^2$

Out[●]= $\left\{3 + \sqrt{2},\ 3 - \sqrt{2}\right\}$

Out[●]= $\left\{\left\{-1 - \sqrt{2},\ 1\right\},\ \left\{-1 + \sqrt{2},\ 1\right\}\right\}$

Forma canónica $\left(3 + \sqrt{2}\right) x{}^{\wedge}2 + \left(3 - \sqrt{2}\right) y{}^{\wedge}2 = a$

In[66]:= `Det[mm] == -5 a`
  └determinante

Out[66]= $-29 == -5\,a$

In[●]:= `Solve[{{0, -1 - √2 , 1}.mm.{1, x, y} == 0, {0, -1 + √2 , 1}.mm.{1, x, y} == 0}, {x, y}]`
resuelve

Out[●]= $\left\{\left\{x \to \dfrac{1}{14}, y \to \dfrac{11}{14}\right\}\right\}$

Sistema de referencia := $\Big\{$ (1 / 14, 11 / 14),

Normalize$\Big[\big\{\{-1 - \sqrt{2} , 1\}, \{-1 + \sqrt{2} , 1\}\big\}\Big]\Big\}$

In[●]:=

`ContourPlot[ 2 x^2 + 2 y^2 - 4 x y + 12 x - 18 y + 11 == 0, {x, -10, 10}, {y, -10, 10}]`
representación de contornos

Out[●]=
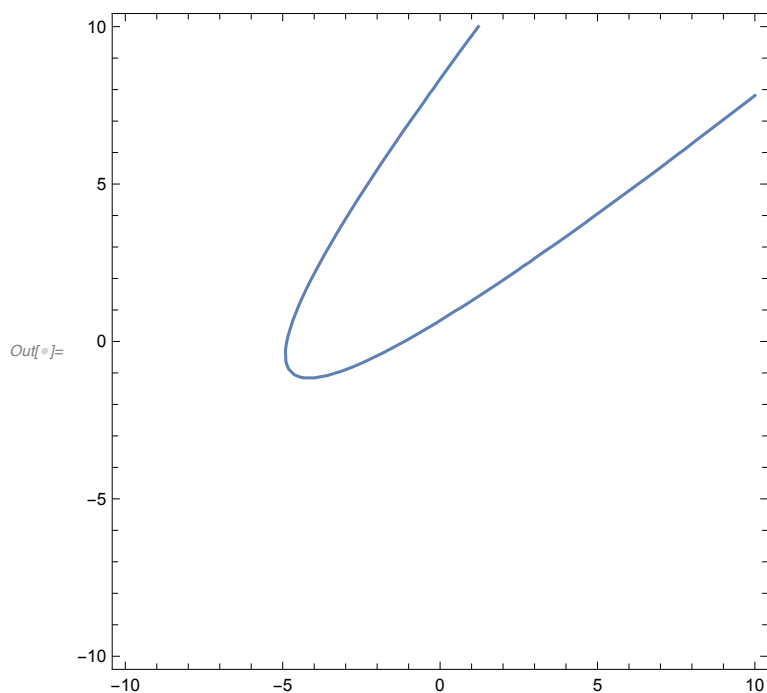
In[●]:= `pp := {{11, 6, -9}, {6, 2, -2}, {-9, -2, 2}}`
`p := {{2, -2}, {-2, 2}}`

In[ ]:=

```
CharacteristicPolynomial[pp, x]
```
polinomio característico

```
CharacteristicPolynomial[p, x]
```
polinomio característico

```
Eigenvalues[p]
```
autovalores

```
Eigenvectors[p]
```
autovectores

Out[ ]= $-18 + 73 \, x + 15 \, x^2 - x^3$

Out[ ]= $-4 \, x + x^2$

Out[ ]= $\{4, 0\}$

Out[ ]= $\{\{-1, 1\}, \{1, 1\}\}$

Parábola 9 y = 4 x^2

In[ ]:=

```
Solve[{{0, -1, 1}.pp.{1, x, y} == 0,
```
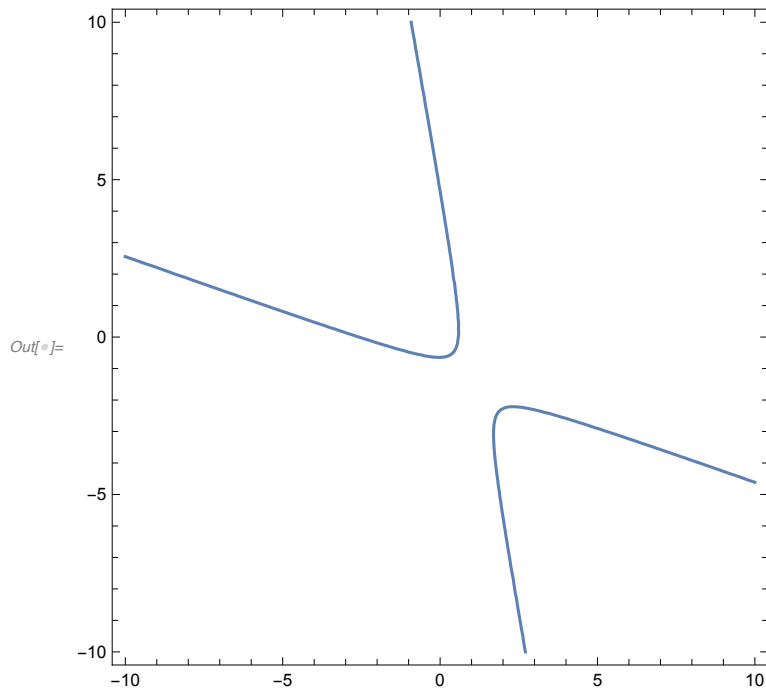resuelve

```
  2 x^2 + 2 y^2 - 4 x y + 12 x - 18 y + 11 == 0}, {x, y}]
```

$\left\{\left\{x \rightarrow -\dfrac{227}{48}, \; y \rightarrow -\dfrac{47}{48}\right\}\right\}$

Sistema de Referencia {(-227/48, -47/48), Normalize[{{-1, 1}, {1, 1}}]]}

```
ContourPlot[ 2 x^2 + 6 x y + y^2 + 4 x - 4 y - 3 == 0, {x, -10, 10}, {y, -10, 10}]
```
⌊representación de contornos

Out[●]=

In[●]:=

```
qq := {{-3, 2, -2}, {2, 2, 3}, {-2, 3, 1}}
q := {{2, 3}, {3, 1}}
```

In[●]:=

```
CharacteristicPolynomial[qq, x]
```
⌊polinomio característico

```
CharacteristicPolynomial[q, x]
```
⌊polinomio característico

```
Eigenvalues[q]
```
⌊autovalores

```
Eigenvectors[q]
```
⌊autovectores

Out[●]= $-15 + 24\,x - x^3$

Out[●]= $-7 - 3\,x + x^2$

Out[●]= $\left\{ \frac{1}{2} \left(3 + \sqrt{37} \right), \frac{1}{2} \left(3 - \sqrt{37} \right) \right\}$

Out[●]= $\left\{ \left\{ \frac{1}{6} \left(1 + \sqrt{37} \right), 1 \right\}, \left\{ \frac{1}{6} \left(1 - \sqrt{37} \right), 1 \right\} \right\}$

In[•]:= $\text{Solve}\Big[\Big\{\{0, \frac{1}{6}\big(1 + \sqrt{37}\big), 1\}.\text{mm}.\{1, x, y\} == 0,$
　　└ resuelve

$\{0, \frac{1}{6}\big(1 - \sqrt{37}\big), 1\}.\text{mm}.\{1, x, y\} == 0\Big\}, \{x, y\}\Big]$

Out[•]= $\Big\{\{x \to \frac{1}{14}, y \to \frac{11}{14}\}\Big\}$

$\text{SR} := \Big\{\Big(\frac{1}{14}, \frac{11}{14}\Big), \Big\{\Big\{\frac{1 + \sqrt{37}}{\sqrt{2\big(37 + \sqrt{37}\big)}}, 3\sqrt{\frac{2}{37 + \sqrt{37}}}\Big\}, \Big\{\frac{1 - \sqrt{37}}{\sqrt{74 - 2\sqrt{37}}}, 3\sqrt{\frac{2}{37 - \sqrt{37}}}\Big\}\Big\}\Big\}$

Sistema de referencia := $\Big\{(1/14, 11/14),$

$\text{Normilize}\Big[\Big\{\Big\{\frac{1}{6}\big(1 + \sqrt{37}\big), 1\Big\}, \Big\{\frac{1}{6}\big(1 - \sqrt{37}\big), 1\Big\}\Big\}\Big]\Big\}$