

```

> restart : with(LinearAlgebra) : with(plots) : with(VectorCalculus) :
> f := (x,y)→ x·y·(x2 - y2 - 1)
      f := (x,y)→ x·y·(x2 + (-y2) - 1) (1)
> SetCoordinates(cartesian[x,y]) :
> grad := Gradient(f(x,y))
      grad := (y(x2 - y2 - 1) + 2x2y)ēx + (x(x2 - y2 - 1) - 2xy2)ēy (2)
> stationary_points := solve({grad[1] = 0, grad[2] = 0}, {x,y})
stationary_points := {x = 0, y = 0}, {x = 0, y = RootOf(_Z2 + 1)}, {x = 1, y = 0}, (3)
      {x = -1, y = 0}, {x = -1/2, y = RootOf(_Z2 + 1)/2}, {x = 1/2, y
      = RootOf(_Z2 + 1)/2}
> hessian := Hessian(f(x,y))
      hessian :=  $\begin{bmatrix} 6xy & 3x^2 - 3y^2 - 1 \\ 3x^2 - 3y^2 - 1 & -6xy \end{bmatrix}$  (4)
> # So now for the first critical point for example:
> Eigenvalues(subs(x = 0, y = 0, hessian))
       $\begin{bmatrix} 1 \\ -1 \end{bmatrix}$  (5)
> # So this is a saddle
> # And so forth...
>

```