```
> restart
> Ecuacion := x^2 - 5 x + 6 = 0
```
$$Ecuacion := x^2 - 5x + 6 = 0 \tag{1}$$

```
> Raiz := solve(Ecuacion)
```
$$Raiz := 3, 2 \tag{2}$$

```
> Raiz[1]
```
$$3 \tag{3}$$

```
> Raiz[2]
```
$$2 \tag{4}$$

```
> EcuacionDos := x^4 + x^2 + 1 = 0
```
$$EcuacionDos := x^4 + x^2 + 1 = 0 \tag{5}$$

```
> RaizDos := solve(EcuacionDos)
```
$$RaizDos := -\frac{1}{2} - \frac{1}{2} I\sqrt{3}, -\frac{1}{2} + \frac{1}{2} I\sqrt{3}, \frac{1}{2} - \frac{1}{2} I\sqrt{3}, \frac{1}{2} + \frac{1}{2} I\sqrt{3} \tag{6}$$

```
> RaizDos[1]
```
$$-\frac{1}{2} - \frac{1}{2} I\sqrt{3} \tag{7}$$

```
> RaizDos[2]
```
$$-\frac{1}{2} + \frac{1}{2} I\sqrt{3} \tag{8}$$

```
> RaizDos[3]
```
$$\frac{1}{2} - \frac{1}{2} I\sqrt{3} \tag{9}$$

```
> RaizDos[4]
```
$$\frac{1}{2} + \frac{1}{2} I\sqrt{3} \tag{10}$$

```
> EcuacionOriginal := expand((x - RaizDos[1])·(x - RaizDos[2])·(x - RaizDos[3])·(x
      - RaizDos[4])) = 0
```
$$EcuacionOriginal := x^4 + x^2 + 1 = 0 \tag{11}$$

```
>
> EcuacionInicial := expand((x - Raiz[1])·(x - Raiz[2]) = 0)
```
$$EcuacionInicial := x^2 - 5x + 6 = 0 \tag{12}$$

```
> restart
> evalf(sqrt(3))
```
$$1.732050808 \tag{13}$$

```
> Digits := 30
```
$$Digits := 30 \tag{14}$$

```
> evalf(sqrt(3))
```
$$1.73205080756887729352744634151 \tag{15}$$

```
> evalf(sqrt(3), 50)
```
$$1.7320508075688772935274463415058723669428052538104 \tag{16}$$

```
> restart
> evalf(pi)
```

$$\pi \tag{17}$$

> $evalf(\text{PI})$

$$\Pi \tag{18}$$

> $evalf(\text{Pi})$

$$3.141592654 \tag{19}$$

> $evalf(\text{Pi}, 10000):$
> $restart$
> $evalf(\exp(1))$

$$2.718281828 \tag{20}$$

> $evalf(\text{Pi})$

$$3.141592654 \tag{21}$$

> $\exp(\text{Pi} \cdot I)$

$$-1 \tag{22}$$

> $restart$
> $Ecua := x \cdot y' + y = y^2 \cdot \log(x)$

$$Ecua := x\left(\frac{d}{dx}\,y(x)\right) + y(x) = y(x)^2 \ln(x) \tag{23}$$

> $Sol := dsolve(Ecua)$

$$Sol := y(x) = \frac{1}{1 + \_C1\,x + \ln(x)} \tag{24}$$

> $DerEcua := isolate(Ecua, diff(y(x), x))$

$$DerEcua := \frac{d}{dx}\,y(x) = \frac{-y(x) + y(x)^2 \ln(x)}{x} \tag{25}$$

> $DerSol := diff(Sol, x)$

$$DerSol := \frac{d}{dx}\,y(x) = -\frac{\_C1 + \dfrac{1}{x}}{(1 + \_C1\,x + \ln(x))^2} \tag{26}$$

> $Comprobacion := simplify(eval(subs(y(x) = rhs(Sol), lhs(Ecua) - rhs(Ecua) = 0)))$

$$Comprobacion := 0 = 0 \tag{27}$$

> $restart$
> $f := x^3 + 3\,x^2 - 2\,x + 1$

$$f := x^3 + 3\,x^2 - 2\,x + 1 \tag{28}$$

Este es un comentario para Montoya

> $Derf := diff(f, x)$

$$Derf := 3\,x^2 + 6\,x - 2 \tag{29}$$

> $Valor := subs(x = 3, Derf)$

$$Valor := 43 \tag{30}$$

> $Intf := int(f, x)$

$$Intf := \frac{1}{4}\,x^4 + x^3 - x^2 + x \tag{31}$$

> $plot(f, x = -1\,..5)$
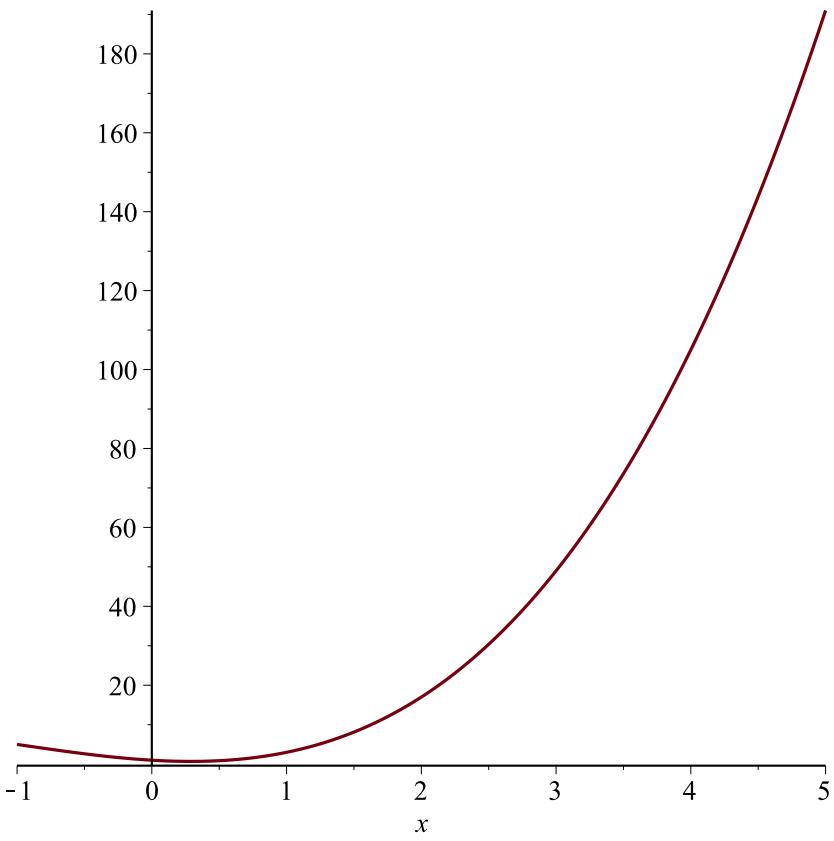
```
> with(plots)
```

[*animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d,* **(32)**
conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot,
display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot,
implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot,
listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple,
odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d,
polyhedra_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions,
setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot]

```
> with(linalg)
```

[*BlockDiagonal, GramSchmidt, JordanBlock, LUdecomp, QRdecomp, Wronskian, addcol,* **(33)**
addrow, adj, adjoint, angle, augment, backsub, band, basis, bezout, blockmatrix, charmat,
charpoly, cholesky, col, coldim, colspace, colspan, companion, concat, cond, copyinto,
crossprod, curl, definite, delcols, delrows, det, diag, diverge, dotprod, eigenvals,
eigenvalues, eigenvectors, eigenvects, entermatrix, equal, exponential, extend, ffgausselim,
fibonacci, forwardsub, frobenius, gausselim, gaussjord, geneqns, genmatrix, grad,
hadamard, hermite, hessian, hilbert, htranspose, ihermite, indexfunc, innerprod, intbasis,
inverse, ismith, issimilar, iszero, jacobian, jordan, kernel, laplacian, leastsqrs, linsolve,

matadd, matrix, minor, minpoly, mulcol, mulrow, multiply, norm, normalize, nullspace, orthog, permanent, pivot, potential, randmatrix, randvector, rank, ratform, row, rowdim, rowspace, rowspan, rref, scalarmul, singularvals, smith, stackmatrix, submatrix, subvector, sumbasis, swapcol, swaprow, sylvester, toeplitz, trace, transpose, vandermonde, vecpotent, vectdim, vector, wronskian]

> $AA := array([[1, 2, 3], [4, -5, 6], [7, 8, 9]])$

$$AA := \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \tag{34}$$

> $Determinante := det(AA)$

$$Determinante := 120 \tag{35}$$

> $Inversa := inverse(AA)$

$$Inversa := \begin{bmatrix} -\dfrac{31}{40} & \dfrac{1}{20} & \dfrac{9}{40} \\ \dfrac{1}{20} & -\dfrac{1}{10} & \dfrac{1}{20} \\ \dfrac{67}{120} & \dfrac{1}{20} & -\dfrac{13}{120} \end{bmatrix} \tag{36}$$

> $Identidad := evalm(AA \,\&{*}\, Inversa)$

$$Identidad := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \tag{37}$$

> $restart$

> $Sol := y(x)^2 \cdot (1 - y(x)) = (x - \_C1)^2$

$$Sol := y(x)^2 (1 - y(x)) = (x - \_C1)^2 \tag{38}$$

> $DerSol := diff(Sol, x)$

$$DerSol := 2\, y(x) \, (1 - y(x)) \left(\frac{d}{dx} y(x) \right) - y(x)^2 \left(\frac{d}{dx} y(x) \right) = 2\,x - 2\, \_C1 \tag{39}$$

> $Para := isolate(Sol, \_C1)$

$$Para := \_C1 = -\sqrt{y(x)^2 (1 - y(x))} + x \tag{40}$$

> $EcuacionDiferencial := isolate(subs(\_C1 = rhs(Para), DerSol), diff(y(x), x))$

$$EcuacionDiferencial := \frac{d}{dx} y(x) = \frac{2\sqrt{y(x)^2 (1 - y(x))}}{2\, y(x) \, (1 - y(x)) - y(x)^2} \tag{41}$$

>

> $with(DEtools):$

> $odeadvisor(EcuacionDiferencial)$

$$[\_quadrature] \tag{42}$$

> $intfactor(EcuacionDiferencial)$

$$\tag{43}$$

$$\frac{3\,y(x) - 2}{\sqrt{-1 + y(x)}} \tag{43}$$

> $FI := \dfrac{3\,y - 2}{\sqrt{-1 + y}}$

$$FI := \frac{3\,y - 2}{\sqrt{-1 + y}} \tag{44}$$

> $M := -2\,\sqrt{y^2\,(1 - y)}$

$$M := -2\,\sqrt{y^2\,(1 - y)} \tag{45}$$

> $N := 2\,y\,(1 - y) - y^2$

$$N := 2\,y\,(1 - y) - y^2 \tag{46}$$

> $Comp := diff(M, y) \neq diff(N, x)$

$$Comp := -\frac{2\,y\,(1 - y) - y^2}{\sqrt{y^2\,(1 - y)}} \neq 0 \tag{47}$$

> $MM := M \cdot FI$

$$MM := -\frac{2\,\sqrt{y^2\,(1 - y)}\,(3\,y - 2)}{\sqrt{-1 + y}} \tag{48}$$

> $NN := N \cdot FI$

$$NN := \frac{\left(2\,y\,(1 - y) - y^2\right)(3\,y - 2)}{\sqrt{-1 + y}} \tag{49}$$

> $CompDos := simplify(diff(MM, y)) = diff(NN, x)$

$$CompDos := \frac{4\,y\,(3\,y^2 - 4\,y + 1)}{\sqrt{-1 + y}\,\sqrt{-y^2\,(-1 + y)}} = 0 \tag{50}$$

> $EcuacionDiferencial$

$$\frac{d}{dx}\,y(x) = \frac{2\,\sqrt{y(x)^2\,(1 - y(x))}}{2\,y(x)\,(1 - y(x)) - y(x)^2} \tag{51}$$

> $ComprobarSingular := eval(subs(y(x) = 1, EcuacionDiferencial))$

$$ComprobarSingular := 0 = 0 \tag{52}$$

> Sol

$$y(x)^2\,(1 - y(x)) = (x - \_C1)^2 \tag{53}$$

> $Parametro := isolate(eval(subs(x = 3, y = 1, Sol)), \_C1)$

$$Parametro := \_C1 = 3 \tag{54}$$

> $SolPart := subs(\_C1 = rhs(Parametro), Sol)$

$$SolPart := y(x)^2\,(1 - y(x)) = (x - 3)^2 \tag{55}$$

> $restart$

> $Ecuacion := 4\,x^2 + x\cdot y - 3\,y^2 + \left(-5\,x^2 + 2\,x\cdot y + y^2\right)\cdot y' = 0$

$$Ecuacion := 4\,x^2 + x\,y(x) - 3\,y(x)^2 + \left(-5\,x^2 + 2\,x\,y(x) + y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{56}$$

> $with(DEtools):$

> *odeadvisor*(*Ecuacion*)

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \tag{57}$$

> $M := 4\,x^2 + x \cdot y - 3\,y^2$

$$M := 4\,x^2 + x\,y - 3\,y^2 \tag{58}$$

> $N := -5\,x^2 + 2\,x \cdot y + y^2$

$$N := -5\,x^2 + 2\,x\,y + y^2 \tag{59}$$

> *diff*$(M, y) \neq$ *diff*(N, x)

$$x - 6\,y \neq -10\,x + 2\,y \tag{60}$$

>

> *intfactor*(*Ecuacion*)

$$\frac{1}{(y(x) - 2\,x)\,(y(x) + 2\,x)\,(y(x) - x)} \tag{61}$$

> $FI := \dfrac{1}{(y - 2\,x)\,(y + 2\,x)\,(y - x)}$

$$FI := \frac{1}{(y - x)\,(y - 2\,x)\,(y + 2\,x)} \tag{62}$$

> $MM := M \cdot FI$

$$MM := \frac{4\,x^2 + x\,y - 3\,y^2}{(y - x)\,(y - 2\,x)\,(y + 2\,x)} \tag{63}$$

> $NN := N \cdot FI$

$$NN := \frac{-5\,x^2 + 2\,x\,y + y^2}{(y - x)\,(y - 2\,x)\,(y + 2\,x)} \tag{64}$$

> *simplify*(*diff*$(MM, y) -$ *diff*$(NN, x)) = 0$

$$0 = 0 \tag{65}$$

> $IMMx :=$ *int*(MM, x)

$$IMMx := \frac{2}{3}\,\ln(-y + x) - \frac{5}{12}\,\ln(y + 2\,x) + \frac{3}{4}\,\ln(-y + 2\,x) \tag{66}$$

> $SolGral := IMMx +$ *int*$((NN -$ *diff*$(IMMx, y)), y) = \_C1$

$$SolGral := -\frac{5}{12}\,\ln(y + 2\,x) + \frac{2}{3}\,\ln(y - x) + \frac{3}{4}\,\ln(y - 2\,x) = \_C1 \tag{67}$$

> $SolSol :=$ *dsolve*(*Ecuacion*)
Warning, computation interrupted

> *plot*$\left(x^2, x = -4 .. 4\right)$