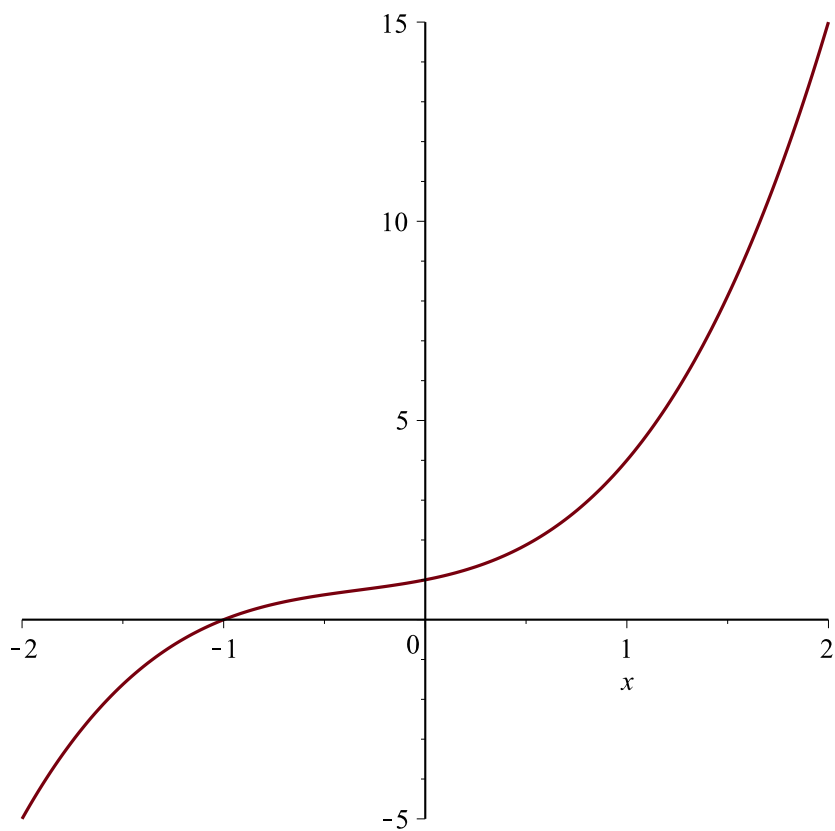


```

[> restart
[> evalf(pi)
                                      $\pi$ 
                                     (1)
[> evalf(Pi)
                                      $\Pi$ 
                                     (2)
[> evalf(Pi)
                                     3.141592654
                                     (3)
[> evalf(sqrt(3))
                                     1.732050808
                                     (4)
[> evalf(sqrt(2), 20)
                                     1.4142135623730950488
                                     (5)
[> alpha := evalf(Pi, 20000) :
[> restart
[> Ecuacion :=  $x^2 - 6x + 9 = 0$ 
                                      $Ecuacion := x^2 - 6x + 9 = 0$ 
                                     (6)
[> Raiz := solve(Ecuacion)
                                      $Raiz := 3, 3$ 
                                     (7)
[> Raiz[1]
                                     3
                                     (8)
[> Raiz[2]
                                     3
                                     (9)
[> Raiz[3]
Error, invalid subscript selector
[> EcuacionDos := expand((x - Raiz[1])^2) = 0
                                      $EcuacionDos := x^2 - 6x + 9 = 0$ 
                                     (10)
[> restart
[> Ecuacion :=  $x^3 + x^2 + x + 1 = 0$ 
                                      $Ecuacion := x^3 + x^2 + x + 1 = 0$ 
                                     (11)
[> Raiz := solve(Ecuacion)
                                      $Raiz := -1, I, -I$ 
                                     (12)
[> EcuacionDos := expand((x - Raiz[1]) * (x - Raiz[2]) * (x - Raiz[3])) = 0
                                      $EcuacionDos := x^3 + x^2 + x + 1 = 0$ 
                                     (13)
[> Raiz[1]
                                     -1
                                     (14)
[> Raiz[2]
                                     I
                                     (15)
[> Raiz[3]
                                     -I
                                     (16)
[> lhs(Ecuacion)
                                      $x^3 + x^2 + x + 1$ 
                                     (17)
[> rhs(Ecuacion)
                                     0
                                     (18)

```

> `plot(lhs(Ecuacion), x=-2..2)`

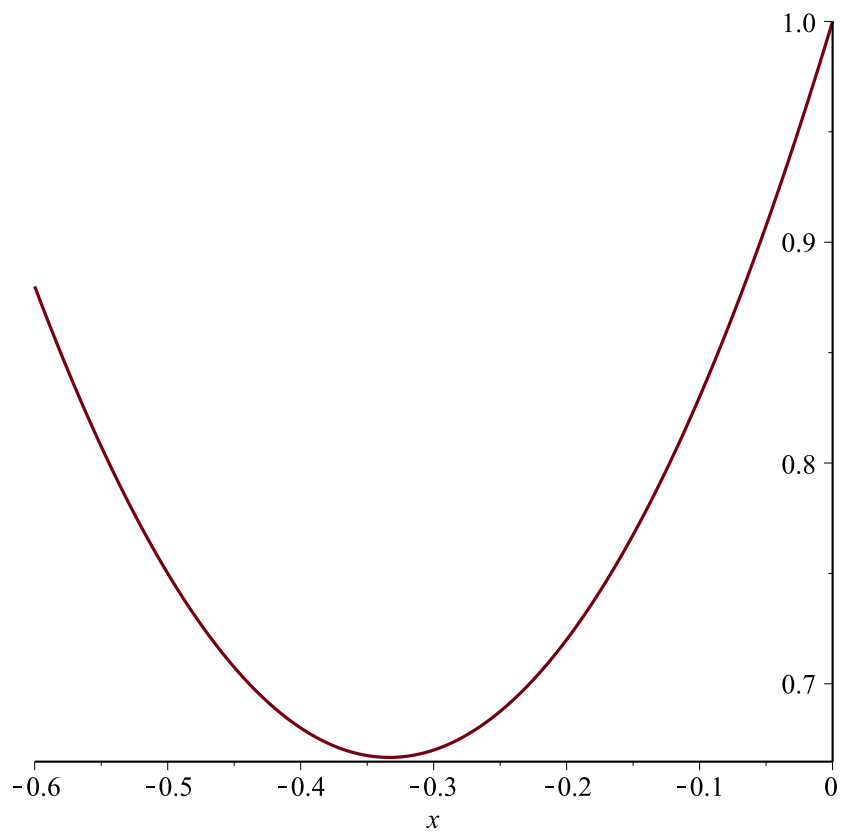


> `DerEcua := diff(Ecuacion, x)`

$$\text{DerEcua} := 3x^2 + 2x + 1 = 0$$

(19)

> `plot(lhs(DerEcua), x=-0.6..0)`

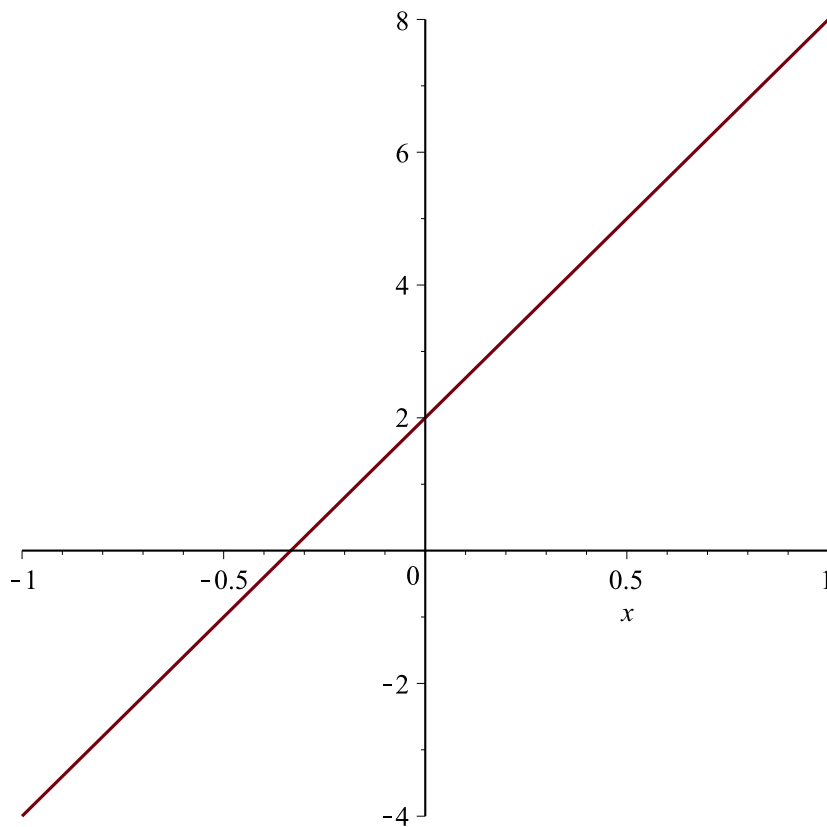


```
> DerDerEcua := diff(DerEcua, x)
```

```
DerDerEcua := 6 x + 2 = 0
```

```
> plot(lhs(DerDerEcua), x = -1 .. 1)
```

(20)



```
> restart
```

Estamos aprendiendo Maple

```
> Funcion := x^2*y - 7*x*y^2
```

$$Funcion := x^2 y - 7 x y^2 \quad (21)$$

```
> DerX := diff(Funcion, x)
```

$$DerX := 2 x y - 7 y^2 \quad (22)$$

```
> DerY := diff(Funcion, y)
```

$$DerY := x^2 - 14 x y \quad (23)$$

```
> DerMixta := diff(Funcion, x, y)
```

$$DerMixta := 2 x - 14 y \quad (24)$$

```
> DerMixtaDos := diff(Funcion, y, x)
```

$$DerMixtaDos := 2 x - 14 y \quad (25)$$

```
> DerSegundaX := diff(Funcion, x$2)
```

$$DerSegundaX := 2 y \quad (26)$$

```
> DerSegundaY := diff(Funcion, y$2)
```

$$DerSegundaY := -14 x \quad (27)$$

```
> restart
```

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

$$AA := \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \quad (28)$$

```
> with(linalg)
```

```
[BlockDiagonal, GramSchmidt, JordanBlock, LUdecomp, QRdecomp, Wronskian, addcol,
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,
rowspan, rref, scalarmul, singularvals, smith, stackmatrix, submatrix, subvector,
sumbasis, swapcol, swaprow, sylvester, toeplitz, trace, transpose, vandermonde, vecpotent,
vectdim, vector, wronskian]
```

```
> Valor := det(AA)
```

$$Valor := 120 \quad (30)$$

```
> MatInv := inverse(AA)
```

$$MatInv := \begin{bmatrix} -\frac{31}{40} & \frac{1}{20} & \frac{9}{40} \\ \frac{1}{20} & -\frac{1}{10} & \frac{1}{20} \\ \frac{67}{120} & \frac{1}{20} & -\frac{13}{120} \end{bmatrix} \quad (31)$$

```
> evalm(AA)
```

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \quad (32)$$

```
> Identidad := evalm(AA &* MatInv)
```

$$Identidad := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (33)$$

```
> evalf(MatInv[3, 1])
```

$$0.5583333333 \quad (34)$$

```
> AA[2, 2]
```

$$-5 \quad (35)$$

> restart

> $F := x^2 \cdot \exp(5x) \cdot \cos(3x)$

$$F := x^2 e^{5x} \cos(3x) \quad (36)$$

> $DerF := \text{diff}(F, x)$

$$DerF := 2x e^{5x} \cos(3x) + 5x^2 e^{5x} \cos(3x) - 3x^2 e^{5x} \sin(3x) \quad (37)$$

> $IntF := \text{int}(F, x)$

$$IntF := \left(\frac{5}{34} x^2 - \frac{8}{289} x - \frac{5}{9826} \right) e^{5x} \cos(3x) - \left(-\frac{3}{34} x^2 + \frac{15}{289} x - \frac{99}{9826} \right) e^{5x} \sin(3x) \quad (38)$$

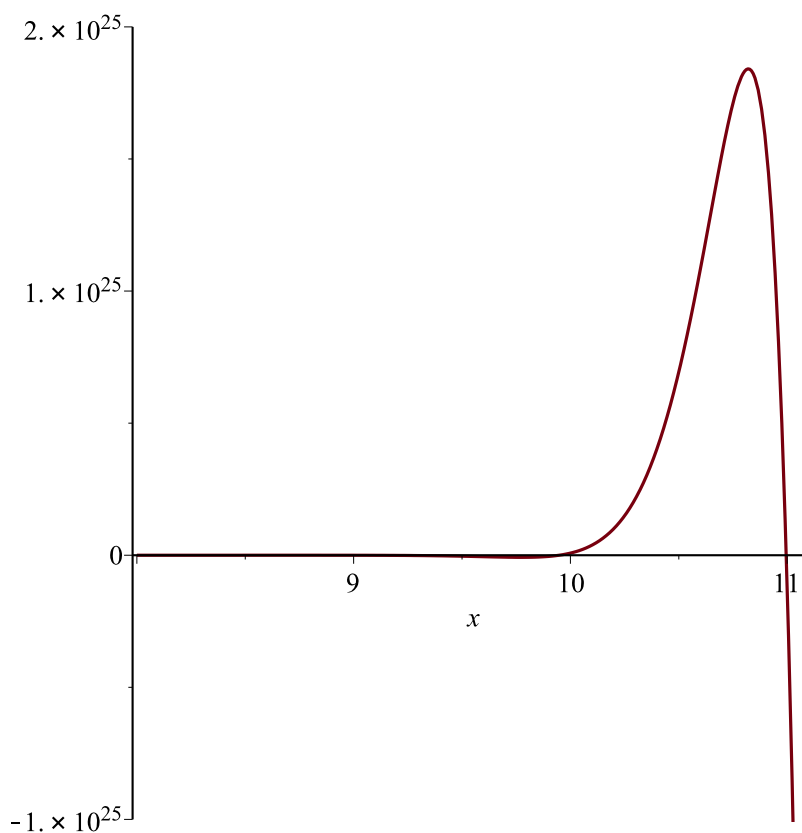
> $IntDefF := \text{int}(F, x=0..5)$

$$IntDefF := \frac{5}{9826} + \frac{17380}{4913} e^{25} \cos(15) + \frac{9612}{4913} e^{25} \sin(15) \quad (39)$$

> $\text{evalf}(\%, 100)$

$$-1.01900331158680327307078990268851218204538611110238866189517451687989418836 \backslash 2964774894136248746017376 10^{11} \quad (40)$$

> $\text{plot}(F, x=8..11.1)$



> evalf(exp(1))

2.718281828

(41)

> exp(Pi*I)

-1

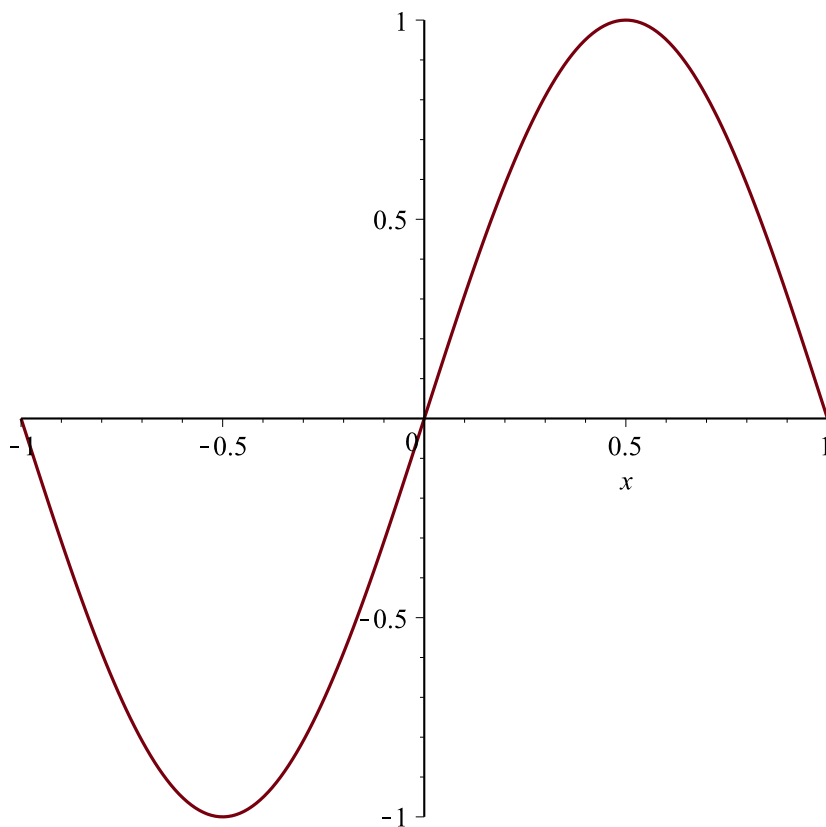
(42)

> exp(x)

e^x

(43)

> plot(sin(Pi*x), x=-1..1)



> restart

> Ecuacion := y'' + 5*y' - 6*y = 0

$$Ecuacion := \frac{d^2}{dx^2} y(x) + 5 \left(\frac{d}{dx} y(x) \right) - 6 y(x) = 0$$

(44)

> SolucionGeneral := dsolve(Ecuacion)

$$SolucionGeneral := y(x) = _C1 e^{-6x} + _C2 e^x$$

(45)

> CondicionInicial := y(0) = 10, D(y)(0) = -5

$$CondicionInicial := y(0) = 10, D(y)(0) = -5$$

(46)

> SolucionParticular := dsolve({Ecuacion, CondicionInicial})

$$SolucionParticular := y(x) = \frac{15}{7} e^{-6x} + \frac{55}{7} e^x$$

(47)

$$\begin{aligned} & \text{ComprobarUno} := \text{simplify}(\text{eval}(\text{subs}(y(x) = \text{rhs}(\text{SolucionGeneral}), \text{Ecuacion}))) \\ & \text{ComprobarUno} := 0 = 0 \end{aligned} \quad (48)$$

$$\begin{aligned} & \text{ComprobarDos} := \text{simplify}(\text{eval}(\text{subs}(y(x) = \text{rhs}(\text{SolucionParticular}), \text{Ecuacion}))) \\ & \text{ComprobarDos} := 0 = 0 \end{aligned} \quad (49)$$

$$\begin{aligned} & \text{ComprobacionTres} := \text{eval}(\text{subs}(x = 0, \text{SolucionParticular})) \\ & \text{ComprobacionTres} := y(0) = 10 \end{aligned} \quad (50)$$

$$\begin{aligned} & \text{ComprobacionCuatro} := D(y)(0) = \text{eval}(\text{subs}(x = 0, \text{diff}(\text{rhs}(\text{SolucionParticular}), x))) \\ & \text{ComprobacionCuatro} := D(y)(0) = -5 \end{aligned} \quad (51)$$

>
>
>