

```

[> restart
PROGRAMA INICIAL
> a := sqrt(2) : b := evalf(%, 5); evalf(a, 40); evalf(%%%)
      b := 1.4142
      1.414213562373095048801688724209698078570
      1.414213562
(1)

> a; b + 0.0000000001
       $\sqrt{2}$ 
      1.414200001
(2)

> evalf(pi)
       $\pi$ 
(3)

> evalf(PI)
       $\Pi$ 
(4)

> evalf(Pi)
      3.141592654
(5)

> Digits := 10000
      Digits := 10000
(6)

> evalf(Pi) :
> Ecuacion := x^2 - 5x + 6 = 0
      Ecuacion :=  $x^2 - 5x + 6 = 0$ 
(7)

> Raiz := solve(Ecuacion)
      Raiz := 3, 2
(8)

> Raiz1
      3
(9)

> Raiz[2]
      2
(10)

> EcuacionOriginal := expand((x - Raiz1) * (x - Raiz2)) = 0
      EcuacionOriginal :=  $x^2 - 5x + 6 = 0$ 
(11)

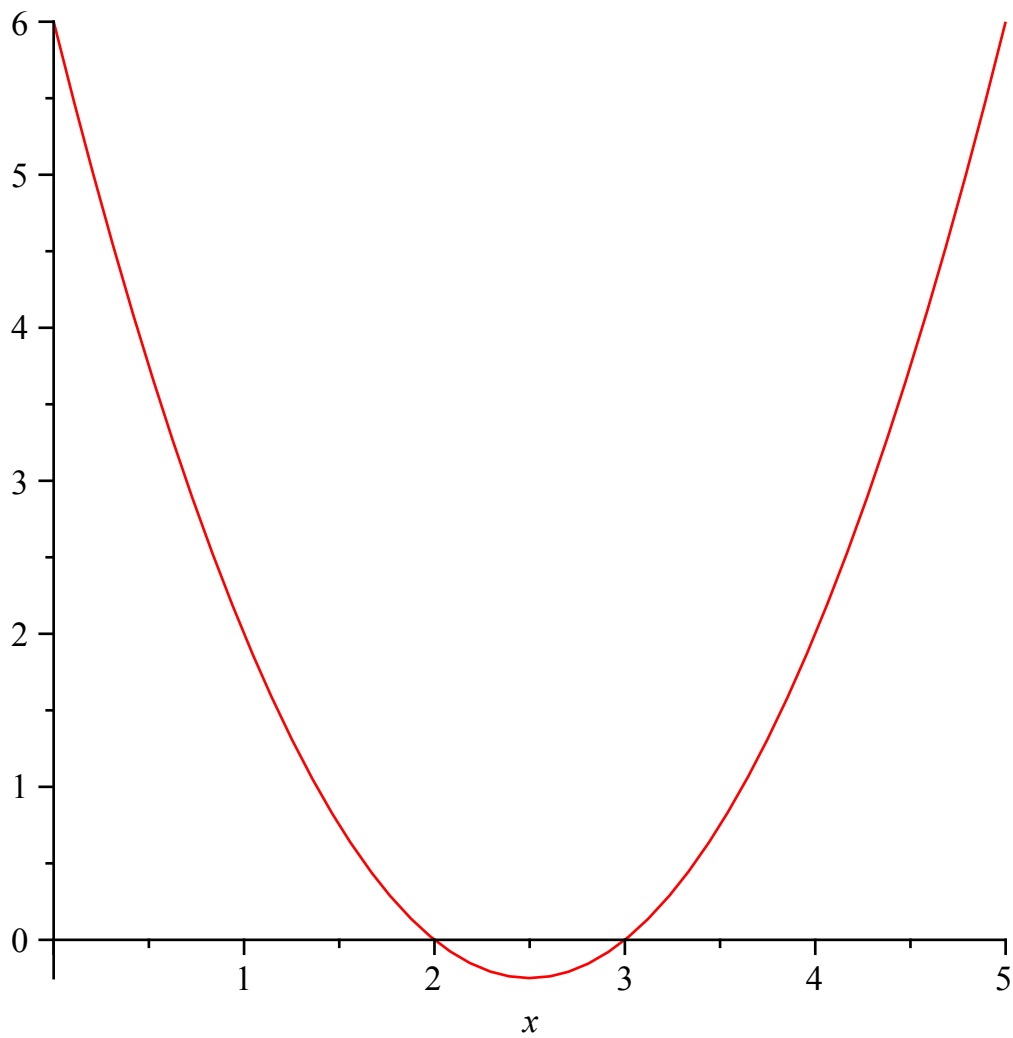
> Ecuacion
       $x^2 - 5x + 6 = 0$ 
(12)

> LadoDerecho := rhs(Ecuacion)
      LadoDerecho := 0
(13)

> LadoIzquierdo := lhs(Ecuacion)
      LadoIzquierdo :=  $x^2 - 5x + 6$ 
(14)

> plot(lhs(Ecuacion), x = 0 .. 5)

```



> *EcuacionDos* := $t \cdot 2 - 4 \cdot t + 4 = 0$

EcuacionDos := $t^2 - 4t + 4 = 0$

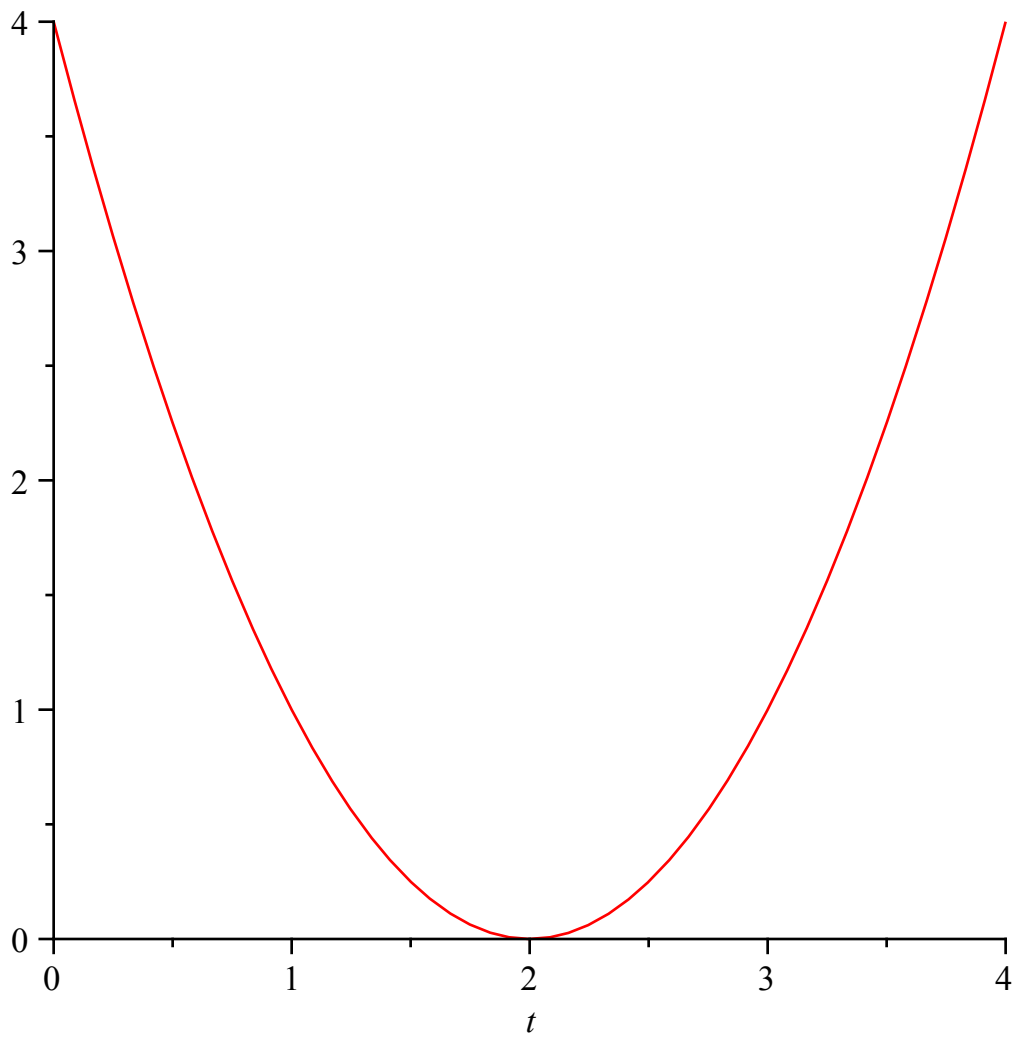
(15)

> *RaizDos* := solve(*EcuacionDos*)

RaizDos := 2, 2

(16)

> plot(*lhs*(*EcuacionDos*), $t = 0 \dots 4$)

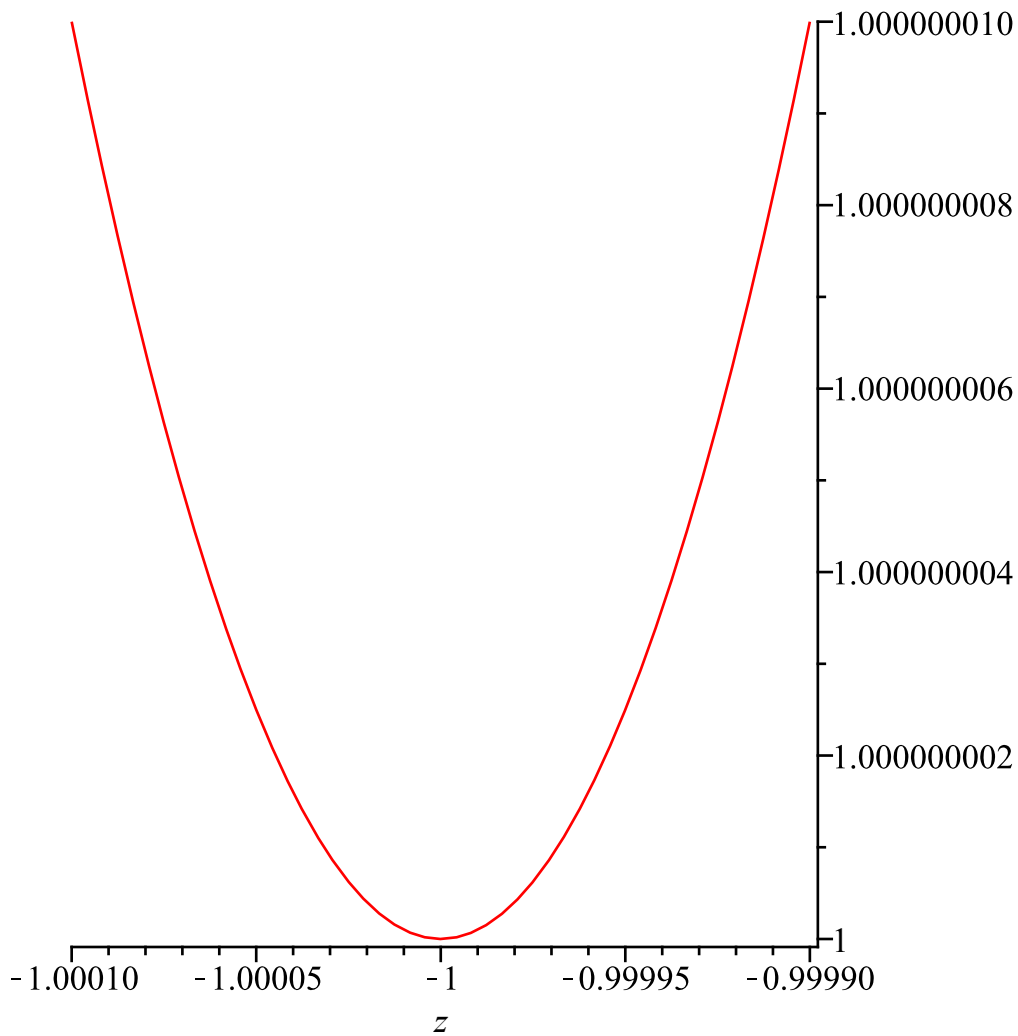


> *EcuacionTres* := $z \cdot 2 + 2 \cdot z + 2 = 0$

EcuacionTres := $z^2 + 2z + 2 = 0$

> *plot*(*lhs*(*EcuacionTres*), $z = -1.0001 \dots -0.9999$)

(17)



$$\begin{aligned} &> \text{RaizTres} := \text{solve}(\text{EcuacionTres}) \\ &\qquad\qquad\qquad \text{RaizTres} := -1 + I, -1 - I \end{aligned} \tag{18}$$

$$\begin{aligned} &> \text{ParteRealRaiz}_1 := \text{Re}(\text{RaizTres}_1) \\ &\qquad\qquad\qquad \text{ParteRealRaiz}_1 := -1 \end{aligned} \tag{19}$$

$$\begin{aligned} &> \text{ParteImagRaiz}_2 := \text{Im}(\text{RaizTres}_2) \\ &\qquad\qquad\qquad \text{ParteImagRaiz}_2 := -1 \end{aligned} \tag{20}$$

$$\begin{aligned} &> \text{ParteImagRaiz}_1 := \text{Im}(\text{RaizTres}_1) \\ &\qquad\qquad\qquad \text{ParteImagRaiz}_1 := 1 \end{aligned} \tag{21}$$

$$\begin{aligned} &> \text{EcuaTresOrig} := \text{expand}((z - \text{RaizTres}_1) \cdot (z - \text{RaizTres}_2)) = 0 \\ &\qquad\qquad\qquad \text{EcuaTresOrig} := z^2 + 2z + 2 = 0 \end{aligned} \tag{22}$$

$$\begin{aligned} &> \text{EcuacionTres} \\ &\qquad\qquad\qquad z^2 + 2z + 2 = 0 \end{aligned} \tag{23}$$

$$\begin{aligned} &> \text{EcuaDosOrig} := \text{expand}((t - \text{RaizDos}_1) \cdot 2) = 0 \\ &\qquad\qquad\qquad \text{EcuaDosOrig} := t^2 - 4t + 4 = 0 \end{aligned} \tag{24}$$

$$> \text{EcuacionDos}$$

$$t^2 - 4t + 4 = 0 \quad (25)$$

> restart

> $f := x \cdot 2 \cdot \exp(5 \cdot x) \cdot \sin(2 \cdot x)$

$$f := x^2 e^{5x} \sin(2x) \quad (26)$$

> $\text{Derivacion} := \text{Diff}(f, x) = \text{diff}(f, x)$

$$\text{Derivacion} := \frac{d}{dx} (x^2 e^{5x} \sin(2x)) = 2x e^{5x} \sin(2x) + 5x^2 e^{5x} \sin(2x) + 2x^2 e^{5x} \cos(2x) \quad (27)$$

> $\text{Integracion} := \text{Int}(f, x) = \text{simplify}(\text{int}(f, x)); \text{evalf}(\%, 3)$

$$\begin{aligned} \text{Integracion} := \int x^2 e^{5x} \sin(2x) dx &= \frac{1}{24389} e^{5x} (-1682 \cos(2x) x^2 + 1160 x \cos(2x) \\ &\quad - 284 \cos(2x) + 4205 \sin(2x) x^2 - 1218 x \sin(2x) + 130 \sin(2x)) \\ \int x^2 e^{5 \cdot x} \sin(2 \cdot x) dx &= 0.0000410 e^{5 \cdot x} (-1680 \cdot \cos(2 \cdot x) x^2 + 1160 \cdot x \cos(2 \cdot x) - 284 \cdot \cos(2 \cdot x) \\ &\quad + 4200 \cdot \sin(2 \cdot x) x^2 - 1220 \cdot x \sin(2 \cdot x) + 130 \cdot \sin(2 \cdot x)) \end{aligned} \quad (28)$$

> $\text{IntegracionDefinida} := \text{Int}(f, x = 1 \dots 3) = \text{evalf}(\text{simplify}(\text{int}(f, x = 1 \dots 3)));$

$$\text{IntegracionDefinida} := \int_1^3 x^2 e^{5x} \sin(2x) dx = -2.822316017 \cdot 10^6 \quad (29)$$

> $\text{plot}(f, x = 2 \dots 3.1)$

