```
> resta[rt
> DiaSemana := Lunes, Martes, Miercoles, Jueves, Viernes, Sabado, Domingo
```

$$DiaSemana := Lunes, Martes, Miercoles, Jueves, Viernes, Sabado, Domingo \quad (1)$$

```
> Dia := [DiaSemana]
```

$$Dia := [Lunes, Martes, Miercoles, Jueves, Viernes, Sabado, Domingo] \quad (2)$$

```
> Dia[1]
```

$$Lunes \quad (3)$$

```
> Dia[5]
```

$$Viernes \quad (4)$$

```
> DiaSemana[7]
```

$$Domingo \quad (5)$$

```
> DiaHabil := Dia[1..5]
```

$$DiaHabil := [Lunes, Martes, Miercoles, Jueves, Viernes] \quad (6)$$

```
> FinSemana := Dia[6..7]
```

$$FinSemana := [Sabado, Domingo] \quad (7)$$

```
> ConjuntoDia := {DiaSemana}
```

$$ConjuntoDia := \{Domingo, Jueves, Lunes, Martes, Sabado, Viernes, Miercoles\} \quad (8)$$

```
> DiaAlfabetico := sort(Dia)
```

$$DiaAlfabetico := [Domingo, Jueves, Lunes, Martes, Miercoles, Sabado, Viernes] \quad (9)$$

```
> ?sort
> Sistema := 2 x + 3 y = 5, 3 x - 4 y = -4; Sistema[1]; Sistema[2]
```

$$Sistema := 2x + 3y = 5, 3x - 4y = -4$$
$$2x + 3y = 5$$
$$3x - 4y = -4 \quad (10)$$

```
> Raiz := solve({Sistema}, {x, y})
```

$$Raiz := \left\{x = \frac{8}{17}, y = \frac{23}{17}\right\} \quad (11)$$

```
> Raiz[1]; Raiz[2]
```

$$x = \frac{8}{17}$$
$$y = \frac{23}{17} \quad (12)$$

```
> Comprobacion[10] := subs(x = rhs(Raiz[1]), y = rhs(Raiz[2]), Sistema[1])
```

$$Comprobacion_{10} := 5 = 5 \quad (13)$$

```
> Comprobacion[20] := subs(x = rhs(Raiz[1]), y = rhs(Raiz[2]), Sistema[2])
```

$$Comprobacion_{20} := -4 = -4 \quad (14)$$

```
> AA := array([[1, -2], [3, 4]])
```

$$AA := \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \quad (15)$$

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

$$BB := \begin{bmatrix} 1 & -2 & 3 \\ -4 & 5 & 6 \\ 7 & 8 & -9 \end{bmatrix} \quad (16)$$

```
> 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, rowspace, rowspan, rref, scalarmul, singularvals, smith, stackmatrix, submatrix, subvector, sumbasis, swapcol, swaprow, sylvester, toeplitz, trace, transpose, vandermonde, vecpotent, vectdim, vector, wronskian] (17)

```
> InvBB := inverse(BB)
```

$$InvBB := \begin{bmatrix} \frac{31}{102} & -\frac{1}{51} & \frac{3}{34} \\ -\frac{1}{51} & \frac{5}{51} & \frac{1}{17} \\ \frac{67}{306} & \frac{11}{153} & \frac{1}{102} \end{bmatrix} \quad (18)$$

```
> evalm(BB)
```

$$\begin{bmatrix} 1 & -2 & 3 \\ -4 & 5 & 6 \\ 7 & 8 & -9 \end{bmatrix} \quad (19)$$

```
> Identidad := evalm( BB &* InvBB)
```

$$Identidad := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (20)$$

```
> Determ := det(BB)
```

$$Determ := -306 \quad (21)$$

```
> Ecuacion := x^3 + x^2 - 7 x - 15 = 0
```

$$Ecuacion := x^3 + x^2 - 7x - 15 = 0 \quad (22)$$

```
> Solucion := solve(Ecuacion)
```

$$Solucion := 3, -2 + I, -2 - I \quad (23)$$

> $EcuacionOriginal := expand\left(\left(x - Solucion_1\right)\cdot\left(x - Solucion_2\right)\cdot\left(x - Solucion_3\right)\right) = 0$

$$EcuacionOriginal := x^3 + x^2 - 7x - 15 = 0 \quad (24)$$

> $Comprobacion_{31} := subs\left(x = Solucion_1, Ecuacion\right)$

$$Comprobacion_{31} := 0 = 0 \quad (25)$$

> $Comprobacion_{32} := subs\left(x = Solucion_2, Ecuacion\right)$

$$Comprobacion_{32} := 0 = 0 \quad (26)$$

> $Comprobacion_{33} := subs\left(x = Solucion_3, Ecuacion\right)$

$$Comprobacion_{33} := 0 = 0 \quad (27)$$

> $restart$

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

$$F := x^3\, e^{-2x}\cos(3x) \quad (28)$$

> $Derivacion := Diff\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x\right) = diff\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x\right)$

$$Derivacion := \frac{d}{dx}\left(x^3\, e^{-2x}\cos(3x)\right) = 3x^2\, e^{-2x}\cos(3x) - 2x^3\, e^{-2x}\cos(3x) - 3x^3\, e^{-2x}\sin(3x) \quad (29)$$

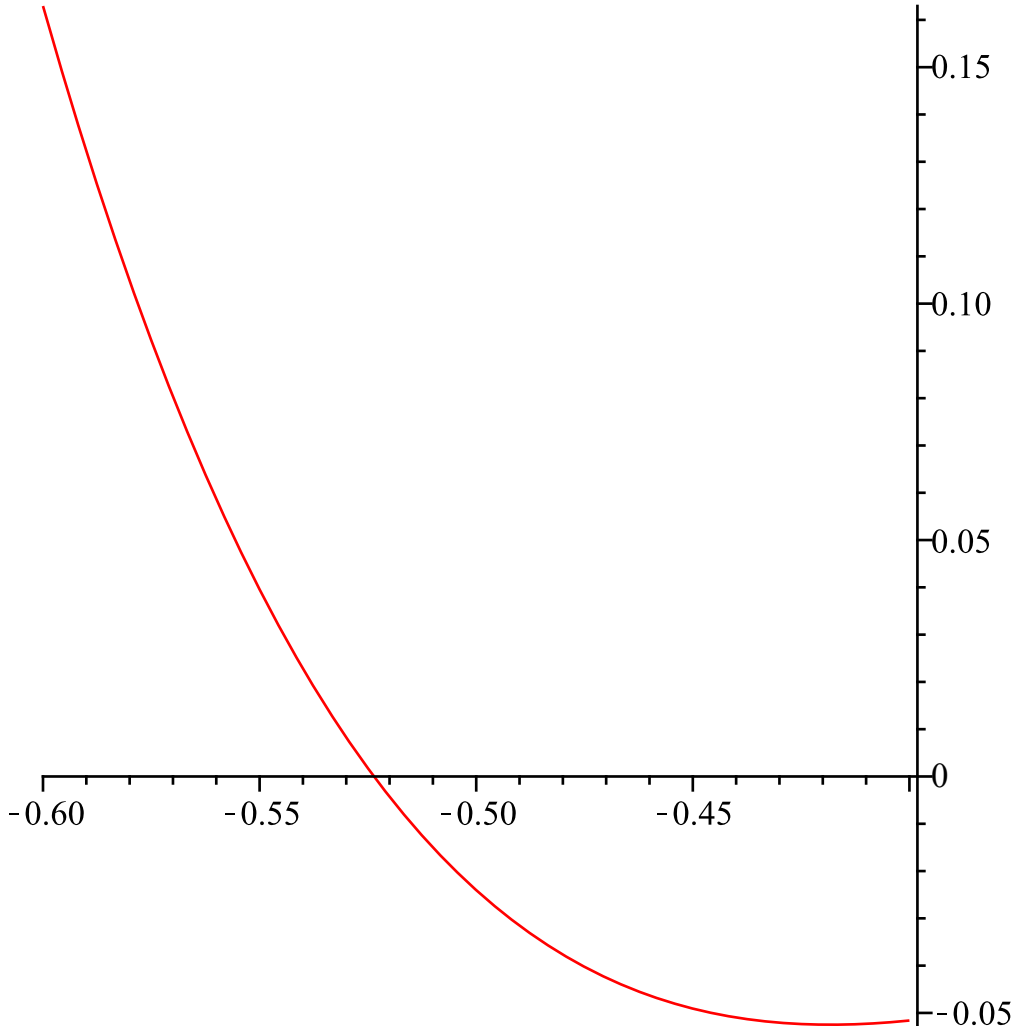
> $IntegracionIndefinida := Int\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x\right) = int\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x\right)$

$$IntegracionIndefinida := \int x^3\, e^{-2x}\cos(3x)\, dx = \left(-\frac{2}{13}x^3 + \frac{15}{169}x^2 + \frac{276}{2197}x + \frac{714}{28561}\right)e^{-2x}\cos(3x) - \left(-\frac{3}{13}x^3 - \frac{36}{169}x^2 - \frac{54}{2197}x + \frac{720}{28561}\right)e^{-2x}\sin(3x) \quad (30)$$

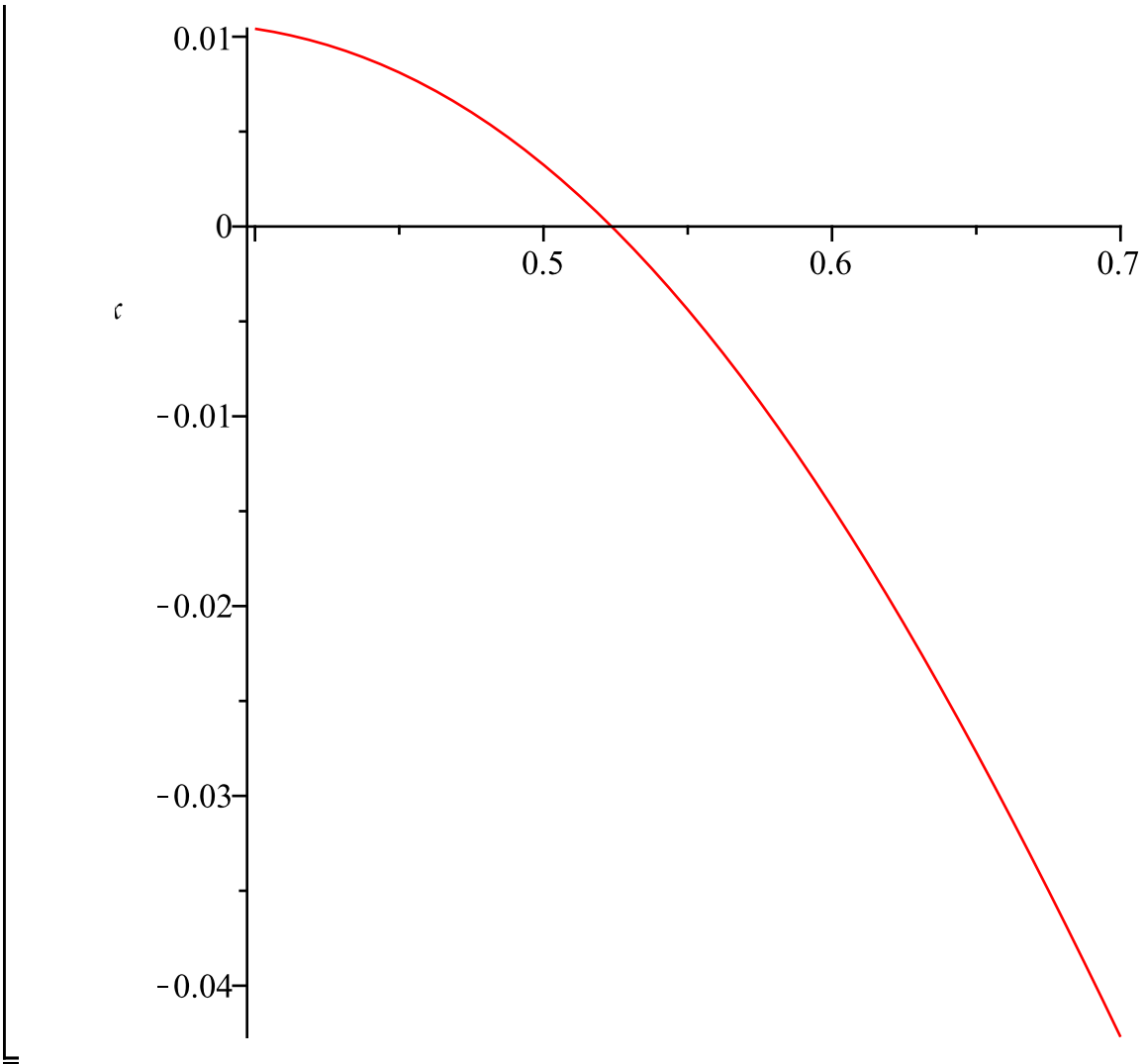
> $IntegracionDefinida := Int\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x = -Pi..Pi\right) = evalf\left(int\left(x^3\cdot\exp(-2x)\cdot\cos(3x), x = -Pi..Pi\right)\right)$

$$IntegracionDefinida := \int_{-\pi}^{\pi} x^3\, e^{-2x}\cos(3x)\, dx = 2825.544647 \quad (31)$$

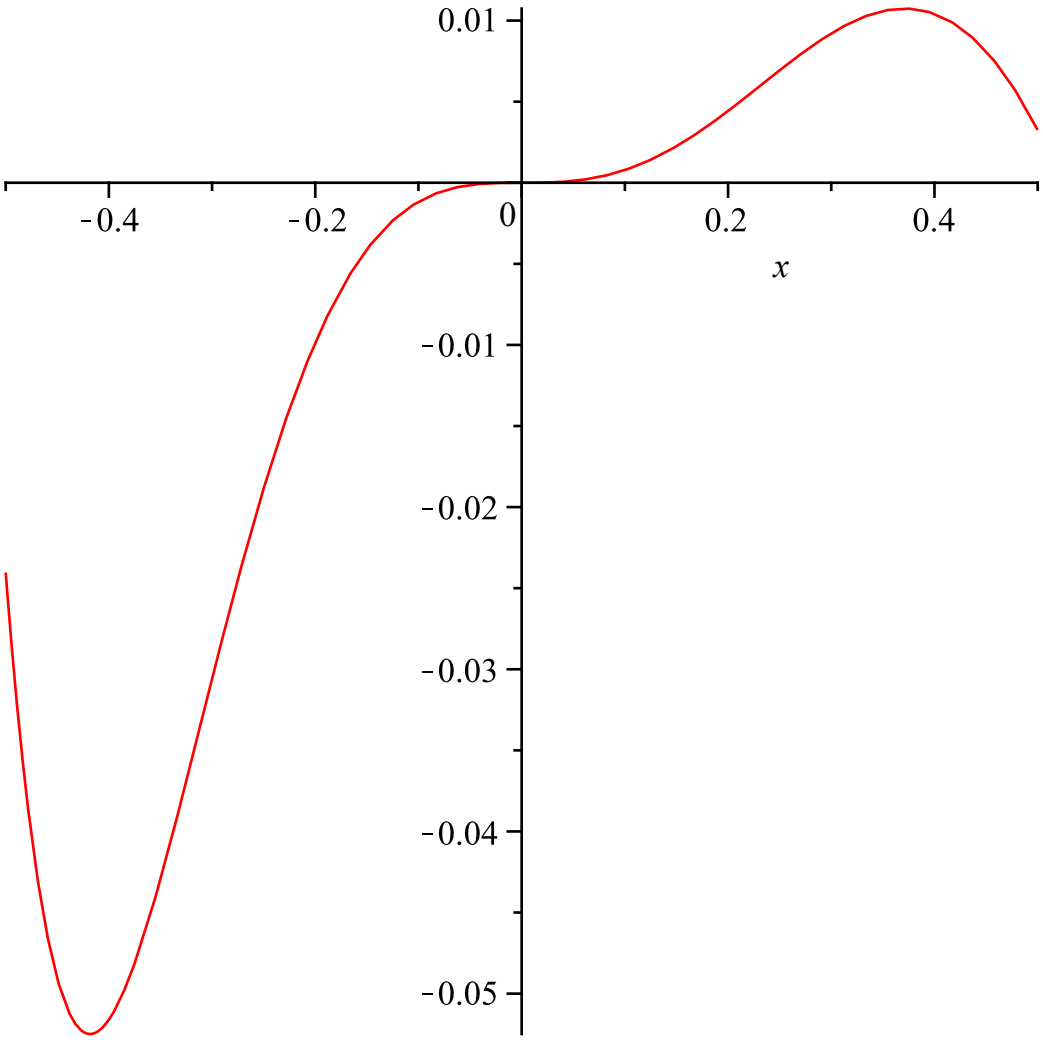
> $plot(F, x = -0.6..-0.4)$



> $plot(F, x = 0.4..0.7)$




```
> plot(F, x =-0.5 ..0.5)
```




```
> Raices := solve(F = 0); evalf(Raices[4])
```

$$Raices := 0, 0, 0, \frac{1}{6}\pi$$

$$0.5235987758 \qquad (32)$$

```
> restart
> EcuacionDiferencial := diff(y(x), x$3) + diff(y(x), x$2) - 7*diff(y(x), x) - 15*y(x) = 0
```

$$EcuacionDiferencial := \frac{d^3}{dx^3} y(x) + \frac{d^2}{dx^2} y(x) - 7\left(\frac{d}{dx} y(x)\right) - 15\, y(x) = 0 \qquad (33)$$

```
> SolucionGeneral := dsolve(EcuacionDiferencial)
```

$$SolucionGeneral := y(x) = _C1\, e^{3x} + _C2\, e^{-2x}\sin(x) + _C3\, e^{-2x}\cos(x) \qquad (34)$$

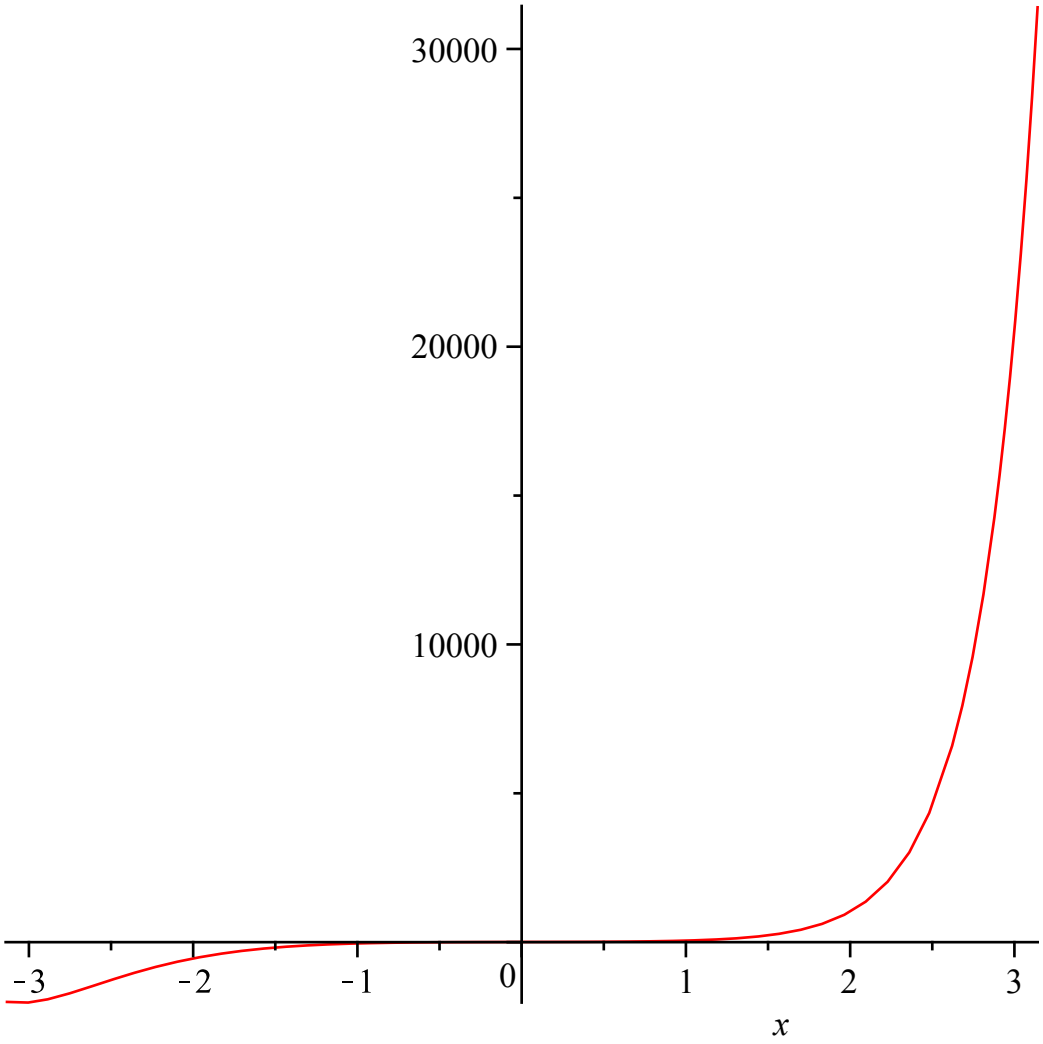
```
> Condiciones := y(0) = 2*Pi, D(y)(0) = 3*Pi, (D@D)(y)(0) = -Pi
```

$$Condiciones := y(0) = 2\pi, D(y)(0) = 3\pi, D^{(2)}(y)(0) = -\pi \qquad (35)$$

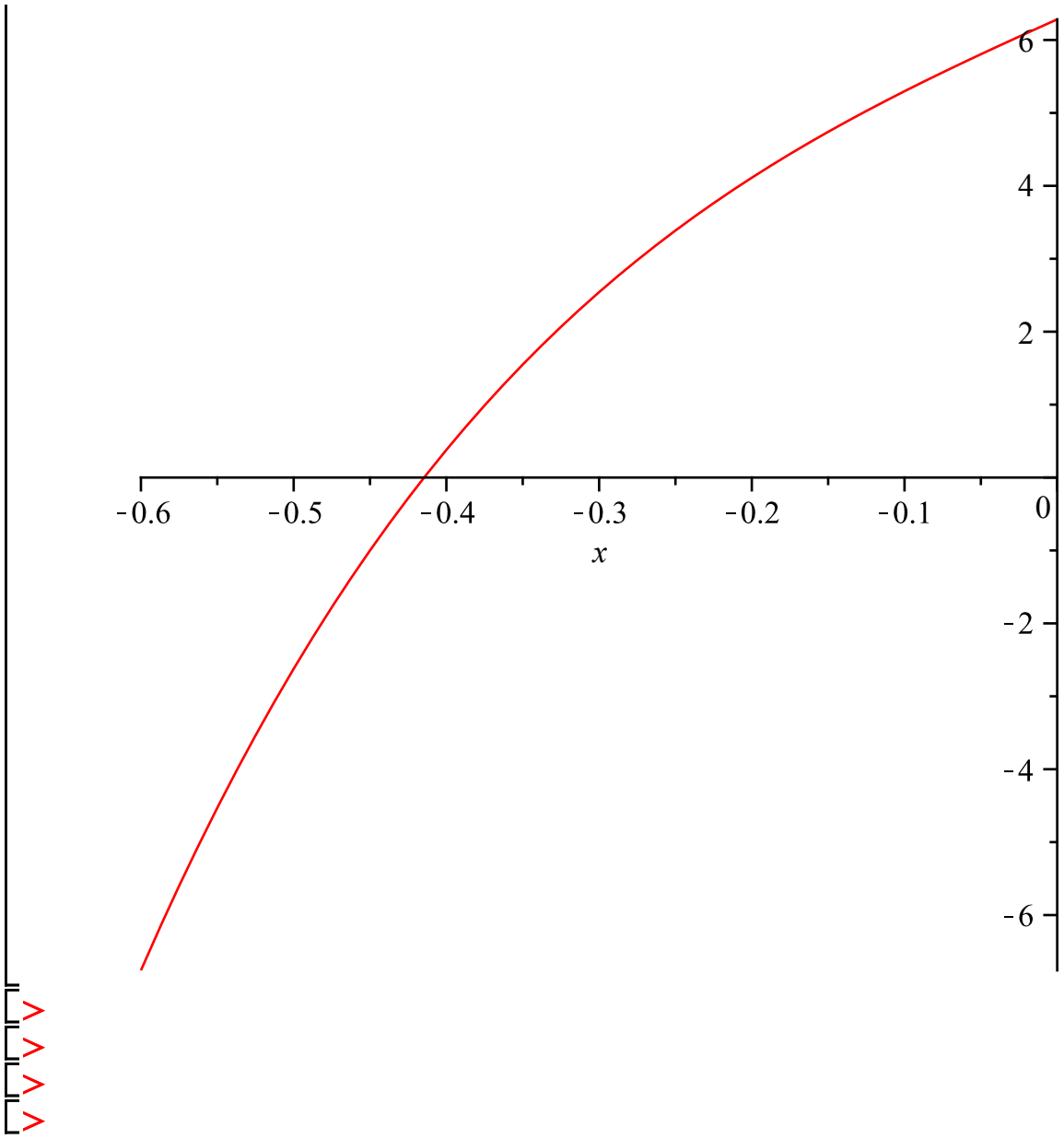
```
> SolucionParticular := dsolve({EcuacionDiferencial, Condiciones})
```

$$SolucionParticular := y(x) = \frac{21}{26}\pi e^{3x} + \frac{77}{26}\pi e^{-2x}\sin(x) + \frac{31}{26}\pi e^{-2x}\cos(x) \qquad (36)$$

```
> plot(rhs(SolucionParticular), x = -Pi..Pi)
```




```
> plot(rhs(SolucionParticular), x=-0.6..0)
```


6
4
2
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0
x
-2
-4
-6

>

>

>

>