

```

> restart
>
ESTA SERÁ LA HOJA INICIAL DEL CURSO DE ECUACIONES DIFERENCIALES
> evalf(Pi)
3.141592654 (1)
> Digits := 20 :
> evalf(Pi)
3.1415926535897932385 (2)
> Digits := 30;
Digits := 30 (3)
> evalf(Pi)
3.14159265358979323846264338328 (4)
> evalf(pi)
 $\pi$  (5)
> evalf(PI)
 $\Pi$  (6)
> evalf(exp(1))
2.71828182845904523536028747135 (7)
> evalf(I)
1. I (8)
> exp(Pi·I)
-1 (9)
> restart
> evalf(Pi)
3.141592654 (10)
> EcuacionDiferencial := diff(y(x), x, x) + 3·diff(y(x), x) - 4·y(x) = 0
EcuacionDiferencial :=  $\frac{d^2}{dx^2} y(x) + 3 \left( \frac{d}{dx} y(x) \right) - 4 y(x) = 0$  (11)
> lhs(EcuacionDiferencial)
 $\frac{d^2}{dx^2} y(x) + 3 \left( \frac{d}{dx} y(x) \right) - 4 y(x)$  (12)
> rhs(EcuacionDiferencial)
0 (13)
> SolucionGeneral := dsolve(EcuacionDiferencial)
SolucionGeneral :=  $y(x) = \_C1 e^{-4x} + \_C2 e^x$  (14)
> lhs(SolucionGeneral)
y(x) (15)
> rhs(SolucionGeneral)
 $\_C1 e^{-4x} + \_C2 e^x$  (16)
> SolucionParticular := subs(_C1 = 4, _C2 = -6, SolucionGeneral)
SolucionParticular :=  $y(x) = 4 e^{-4x} - 6 e^x$  (17)
> SolucionFundamental[1] := subs(_C1 = 1, _C2 = 0, SolucionGeneral)

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$$\text{SolucionFundamental}_1 := y(x) = e^{-4x} \quad (18)$$

$$\begin{aligned} &> \text{SolucionFundamental}[2] := \text{subs}(_C1 = 0, _C2 = 1, \text{SolucionGeneral}) \\ &\quad \text{SolucionFundamental}_2 := y(x) = e^x \end{aligned} \quad (19)$$

$$\begin{aligned} &> \text{Ecuacion} := x \cdot 3 - 5 \cdot x \cdot 2 + 6 \cdot x - 8 = 0 \\ &\quad \text{Ecuacion} := x^3 - 5x^2 + 6x - 8 = 0 \end{aligned} \quad (20)$$

$$\begin{aligned} &> \text{Raiz} := \text{solve}(\text{Ecuacion}); \text{Aprox} := \text{evalf}(\%, 5) \\ &\quad \text{Raiz} := 4, \frac{1}{2} - \frac{1}{2} i\sqrt{7}, \frac{1}{2} + \frac{1}{2} i\sqrt{7} \\ &\quad \text{Aprox} := 4., 0.50000 - 1.3229 i, 0.50000 + 1.3229 i \end{aligned} \quad (21)$$

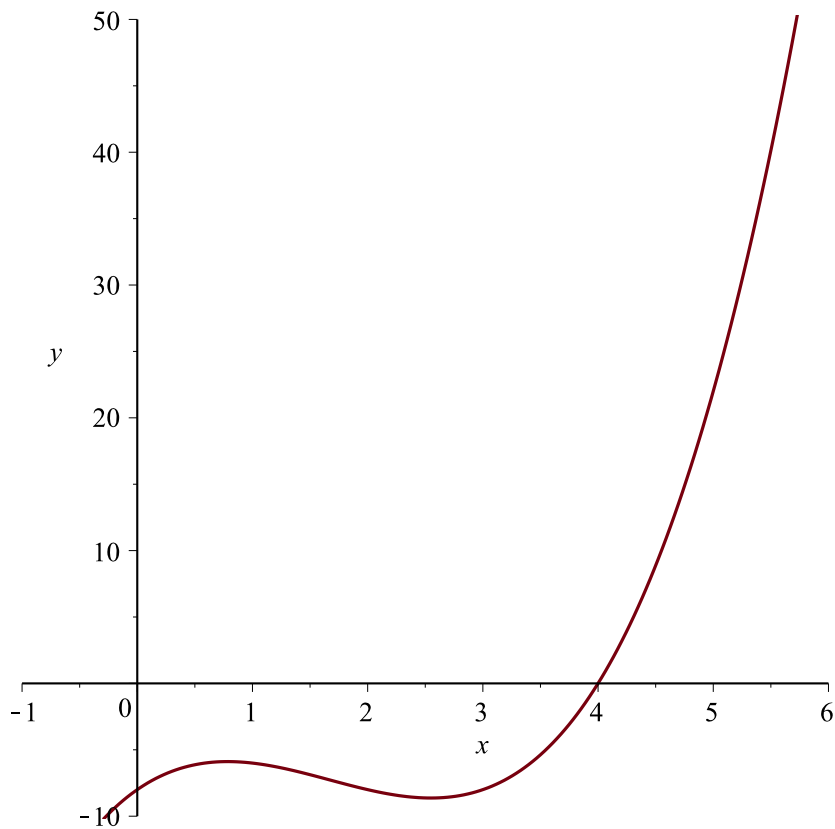
$$\begin{aligned} &> \text{Raiz}[1]; \text{Raiz}[2]; \text{Raiz}[3] \\ &\quad \frac{1}{2} - \frac{1}{2} i\sqrt{7} \\ &\quad \frac{1}{2} + \frac{1}{2} i\sqrt{7} \end{aligned} \quad (22)$$

$$\begin{aligned} &> \text{EcuacionOriginal}[1] := (x - \text{Raiz}[1]) \cdot (x - \text{Raiz}[2]) \cdot (x - \text{Raiz}[3]) = 0 \\ &\quad \text{EcuacionOriginal}_1 := (x - 4) \left(x - \frac{1}{2} + \frac{1}{2} i\sqrt{7} \right) \left(x - \frac{1}{2} - \frac{1}{2} i\sqrt{7} \right) = 0 \end{aligned} \quad (23)$$

$$\begin{aligned} &> \text{EcuacionOriginal}[2] := \text{expand}((x - \text{Raiz}[1]) \cdot (x - \text{Raiz}[2]) \cdot (x - \text{Raiz}[3])) = 0 \\ &\quad \text{EcuacionOriginal}_2 := x^3 - 5x^2 + 6x - 8 = 0 \end{aligned} \quad (24)$$

$$\begin{aligned} &> \text{EcuacionAproximada} := \text{expand}((x - \text{Aprox}[1]) \cdot (x - \text{Aprox}[2]) \cdot (x - \text{Aprox}[3])) = 0 \\ &\quad \text{EcuacionAproximada} := x^3 - 5.00000x^2 - 8.000257640 + 0. i + 6.000064410x = 0 \end{aligned} \quad (25)$$

$$> \text{plot}(\text{lhs}(\text{EcuacionOriginal}[1]), x = -1 .. 6, y = -10 .. 50)$$



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> Ecuacion[2] := diff(lhs(Ecuacion), x) = 0
      Ecuacion2 := 3 x2 - 10 x + 6 = 0 (26)
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```
> Solucion[2] := solve(Ecuacion[2]); evalf(%, 5)
      Solucion2 := 5/3 + 1/3 √7, 5/3 - 1/3 √7
                  2.5486, 0.78478 (27)
```

```
> restart
> Semana := [lunes, martes, miercoles, jueves, viernes, sabado, domingo]
      Semana := [lunes, martes, miercoles, jueves, viernes, sabado, domingo] (28)
```

```
> DiaUno := Semana[1]
      DiaUno := lunes (29)
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> FinSemana := Semana[6..7]
      FinSemana := [sabado, domingo] (30)
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```
> SemanaHabil := Semana[1..5]
      SemanaHabil := [lunes, martes, miercoles, jueves, viernes] (31)
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```
> Ordenarla := sort(Semana)
      Ordenarla := [domingo, jueves, lunes, martes, miercoles, sabado, viernes] (32)
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> Ordenarla[3]
```

$$lunes \quad (33)$$

```
> Semana
```

$$[lunes, martes, miercoles, jueves, viernes, sabado, domingo] \quad (34)$$

```
> Conjunto := {lunes, martes, miercoles, jueves, viernes, sabado, domingo}
```

$$Cunjunto := \{domingo, jueves, lunes, martes, sabado, viernes, miercoles\} \quad (35)$$

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

$$Matriz := \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \quad (36)$$

```
> with(linalg) :
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> Valor := det(Matriz)
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$$Valor := 120 \quad (37)$$

```
> Inv := inverse(Matriz)
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$$Inv := \begin{bmatrix} -\frac{31}{40} & \frac{1}{20} & \frac{9}{40} \\ \frac{1}{20} & -\frac{1}{10} & \frac{1}{20} \\ \frac{67}{120} & \frac{1}{20} & -\frac{13}{120} \end{bmatrix} \quad (38)$$

```
> Ident := evalm(Matriz & Inv)
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$$Ident := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (39)$$

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>
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