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> restart
> Funcion := y(x) = exp(3·x)·cos(4·x)
Funcion := y(x) = e3 x cos(4 x) (1)
> DerFun := diff(Funcion, x)
DerFun := d/dx y(x) = 3 e3 x cos(4 x) - 4 e3 x sin(4 x) (2)
> DerDerFuncion := diff(DerFun, x)
DerDerFuncion := d2/dx2 y(x) = -7 e3 x cos(4 x) - 24 e3 x sin(4 x) (3)
> Final := DerDerFuncion - 2·3·DerFun + (9 + 16)·Funcion
Final := d2/dx2 y(x) - 6 d/dx y(x) + 25 y(x) = 0 (4)
> restart
> Ecua := y'' - 7·y' + 12·y = 5·exp(6·x)
Ecua := d2/dx2 y(x) - 7 d/dx y(x) + 12 y(x) = 5 e6 x (5)
> Solgral := dsolve(Ecua)
Solgral := y(x) = e3 x c2 + e4 x c1 + 5 e6 x / 6 (6)
> restart
> Ecua := y'' - 4·y' + 4·y = 2·exp(2·x) + 8·x2
Ecua := d2/dx2 y(x) - 4 d/dx y(x) + 4 y(x) = 2 e2 x + 8 x2 (7)
> SolPartQ := y(x) = A·x2·exp(2 x) + B + D·x + E·x2
SolPartQ := y(x) = A x2 e2 x + B + D x + E x2 (8)
> Para := simplify(eval(subs(y(x) = rhs(SolPartQ), Ecua)))
Para := 2 A e2 x + (4 x2 - 8 x + 2) E + 4 D x + 4 B - 4 D = 2 e2 x + 8 x2 (9)
> EcuaUno := 2·A = 2
EcuaUno := 2 A = 2 (10)
> EcuaDos := 4·E = 8
EcuaDos := 4 E = 8 (11)
> EcuaTres := -8·E + 4·D = 0
EcuaTres := -8 E + 4 D = 0 (12)
> EcuaCuatro := 2·E + 4·B - 4·D = 0
EcuaCuatro := 2 E + 4 B - 4 D = 0 (13)
> Parametro := solve({EcuaUno, EcuaDos, EcuaTres, EcuaCuatro}, {A, B, D, E})
Parametro := {A = 1, B = 3, D = 4, E = 2} (14)
> SolGral := y(x) = _C1·exp(2 x) + _C2·x·exp(2·x) + A·x2·exp(2·x) + B + D·x + E·x2
SolGral := y(x) = _C1 e2 x + _C2 x e2 x + A x2 e2 x + B + D x + E x2 (15)

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$$\begin{aligned} &> \text{SolFinal} := \text{expand}(\text{subs}(A = \text{rhs}(\text{Parametro}[1]), B = \text{rhs}(\text{Parametro}[2]), D \\ &\quad = \text{rhs}(\text{Parametro}[3]), E = \text{rhs}(\text{Parametro}[4]), \text{SolGral})) \\ &\quad \text{SolFinal} := y(x) = \_C1 (e^x)^2 + \_C2 x (e^x)^2 + x^2 (e^x)^2 + 3 + 4x + 2x^2 \end{aligned} \quad (16)$$

$$\begin{aligned} &> \text{Ecua} \\ &\quad \frac{d^2}{dx^2} y(x) - 4 \frac{d}{dx} y(x) + 4 y(x) = 2 e^{2x} + 8 x^2 \end{aligned} \quad (17)$$

$$\begin{aligned} &> \text{Comprobar} := \text{simplify}(\text{eval}(\text{subs}(y(x) = \text{rhs}(\text{SolFinal}), \text{Ecua}))) \\ &\quad \text{Comprobar} := 2 e^{2x} + 8 x^2 = 2 e^{2x} + 8 x^2 \end{aligned} \quad (18)$$

$$\begin{aligned} &> \text{restart} \\ &> \text{Ecua} := \text{diff}(y(t), t\$2) + 9 \cdot y(t) = 2 \cdot \sin(3 \cdot t) \\ &\quad \text{Ecua} := \frac{d^2}{dt^2} y(t) + 9 y(t) = 2 \sin(3 t) \end{aligned} \quad (19)$$

$$\begin{aligned} &> \text{SolPartQ} := y(t) = A \cdot t \cdot \cos(3 \cdot t) + B \cdot t \cdot \sin(3 \cdot t) \\ &\quad \text{SolPartQ} := y(t) = A t \cos(3 t) + B t \sin(3 t) \end{aligned} \quad (20)$$

$$\begin{aligned} &> \text{Parametros} := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolPartQ}), \text{Ecua}))) \\ &\quad \text{Parametros} := -6 A \sin(3 t) + 6 B \cos(3 t) = 2 \sin(3 t) \end{aligned} \quad (21)$$

$$\begin{aligned} &> \text{EcuaUno} := -6 \cdot A = 2 \\ &\quad \text{EcuaUno} := -6 A = 2 \end{aligned} \quad (22)$$

$$\begin{aligned} &> \text{EcuaDos} := 6 \cdot B = 0 \\ &\quad \text{EcuaDos} := 6 B = 0 \end{aligned} \quad (23)$$

$$\begin{aligned} &> \text{Para} := \text{solve}(\{\text{EcuaUno}, \text{EcuaDos}\}, \{A, B\}) \\ &\quad \text{Para} := \left\{ A = -\frac{1}{3}, B = 0 \right\} \end{aligned} \quad (24)$$

$$\begin{aligned} &> \text{SolGral} := y(x) = \_C1 \cdot \cos(3 \cdot t) + \_C2 \cdot \sin(3 \cdot t) + A \cdot t \cdot \cos(3 \cdot t) + B \cdot t \cdot \sin(3 \cdot t) \\ &\quad \text{SolGral} := y(x) = \_C1 \cos(3 t) + \_C2 \sin(3 t) + A t \cos(3 t) + B t \sin(3 t) \end{aligned} \quad (25)$$

$$\begin{aligned} &> \text{SolGralNoHom} := \text{subs}(A = \text{rhs}(\text{Para}[1]), B = \text{rhs}(\text{Para}[2]), \text{SolGral}) \\ &\quad \text{SolGralNoHom} := y(x) = \_C1 \cos(3 t) + \_C2 \sin(3 t) - \frac{t \cos(3 t)}{3} \end{aligned} \quad (26)$$

$$\begin{aligned} &> \text{Ecua} \\ &\quad \frac{d^2}{dt^2} y(t) + 9 y(t) = 2 \sin(3 t) \end{aligned} \quad (27)$$

$$\begin{aligned} &> \text{Comprobar} := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolGralNoHom}), \text{lhs}(\text{Ecua}) - \text{rhs}(\text{Ecua}) = 0))) \\ &\quad \text{Comprobar} := 0 = 0 \end{aligned} \quad (28)$$