> *restart*

> $Ecua := 4\cdot x^2 - x\cdot y + y^2 + (x^2 - x\cdot y + 4\cdot y^2)\cdot y' = 0$

$$Ecua := 4x^2 - x\,y(x) + y(x)^2 + \left(x^2 - x\,y(x) + 4\,y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \quad \textbf{(1)}$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \quad \textbf{(2)}$$

> $EcuaDos := simplify(isolate(eval(subs(y(x) = u(x)\cdot x, Ecua)), diff(u(x), x)))$

$$EcuaDos := \frac{d}{dx}\,u(x) = \frac{-4\,u(x)^3 - 4}{x\left(4\,u(x)^2 - u(x) + 1\right)} \quad \textbf{(3)}$$

> $odeadvisor(EcuaDos)$

$$[\_separable] \quad \textbf{(4)}$$

> $M := -(-4\,u^3 - 4)$

$$M := 4\,u^3 + 4 \quad \textbf{(5)}$$

> $N := x\,(4\,u^2 - u + 1)$

$$N := x\,(4\,u^2 - u + 1) \quad \textbf{(6)}$$

> $Px := 4;\ Qu := u^3 + 1;\ Rx := x;\ Su := 4\cdot u^2 - u + 1$

$$Px := 4$$

$$Qu := u^3 + 1$$

$$Rx := x$$

$$Su := 4\,u^2 - u + 1 \quad \textbf{(7)}$$

> $SolGralCero := int\left(\frac{Px}{Rx}, x\right) + int\left(\frac{Su}{Qu}, u\right) = \_C1$

$$SolGralCero := 4\ln(x) + 2\ln(u + 1) + \ln(u^2 - u + 1) = \_C1 \quad \textbf{(8)}$$

> $SolGralUno := subs\left(u = \frac{y(x)}{x}, SolGralCero\right)$

$$SolGralUno := 4\ln(x) + 2\ln\left(\frac{y(x)}{x} + 1\right) + \ln\left(\frac{y(x)^2}{x^2} - \frac{y(x)}{x} + 1\right) = \_C1 \quad \textbf{(9)}$$

> $SolGralFinal := expand(simplify(\exp(lhs(SolGralUno)) = \_C10))$

$$SolGralFinal := y(x)^4 + y(x)^3\,x + x^3\,y(x) + x^4 = \_C10 \quad \textbf{(10)}$$

> $Ecua$

$$4x^2 - x\,y(x) + y(x)^2 + \left(x^2 - x\,y(x) + 4\,y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \quad \textbf{(11)}$$

> $DerSolFinal := isolate(diff(SolGralFinal, x), diff(y(x), x))$

$$DerSolFinal := \frac{d}{dx}\,y(x) = \frac{-y(x)^3 - 3\,y(x)\,x^2 - 4\,x^3}{4\,y(x)^3 + 3\,y(x)^2\,x + x^3} \quad \textbf{(12)}$$

> $DerEcua := isolate(Ecua, diff(y(x), x))$

(13)

$$DerEcua := \frac{d}{dx}\, y(x) = \frac{-4\,x^2 + x\,y(x) - y(x)^2}{x^2 - x\,y(x) + 4\,y(x)^2} \tag{13}$$

> $Comprobar := simplify(rhs(DerEcua) - rhs(DerSolFinal) = 0)$

$$Comprobar := 0 = 0 \tag{14}$$

> $restart$

> $Ecua := y' = \frac{2\cdot x\cdot y}{3\,x^2 - y^2}$

$$Ecua := \frac{d}{dx}\, y(x) = \frac{2\,x\,y(x)}{3\,x^2 - y(x)^2} \tag{15}$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[[\_homogeneous,\ class\ A],\ \_rational,\ \_dAlembert] \tag{16}$$

> $EcuaDos := simplify(isolate(eval(subs(y(x) = x\cdot u(x), Ecua)), diff(u(x), x)))$

$$EcuaDos := \frac{d}{dx}\, u(x) = \frac{u(x)\left(-1 + \frac{2}{3 - u(x)^2}\right)}{x} \tag{17}$$

> $Mxu := expand\left(-\left(u\cdot\left(-1 + \frac{2}{3 - u^2}\right)\right)\right)$

$$Mxu := u - \frac{2\,u}{-u^2 + 3} \tag{18}$$

> $Nxu := x$

$$Nxu := x \tag{19}$$

> $Px := 1; Qu := Mxu; Rx := x; Su := 1$

$$Px := 1$$

$$Qu := u - \frac{2\,u}{-u^2 + 3}$$

$$Rx := x$$

$$Su := 1 \tag{20}$$

> $SolGralCero := int\left(\frac{Px}{Rx}, x\right) + int\left(\frac{Su}{Qu}, u\right) = \_C1$

$$SolGralCero := \ln(x) - \ln(u - 1) - \ln(u + 1) + 3\ln(u) = \_C1 \tag{21}$$

> $SolGralUno := subs\left(u = \frac{y(x)}{x}, SolGralCero\right)$

$$SolGralUno := \ln(x) - \ln\left(\frac{y(x)}{x} - 1\right) - \ln\left(\frac{y(x)}{x} + 1\right) + 3\ln\left(\frac{y(x)}{x}\right) = \_C1 \tag{22}$$

> $SolFinal := simplify(\exp(lhs(SolGralUno)) = \_C10)$

$$SolFinal := \frac{y(x)^3}{y(x)^2 - x^2} = \_C10 \tag{23}$$

> $Ecua$

$$\frac{d}{dx}\, y(x) = \frac{2\, x\, y(x)}{3\, x^2 - y(x)^2} \tag{24}$$

> $DerSolFinal := isolate(diff(SolFinal, x), diff(y(x), x))$

$$DerSolFinal := \frac{d}{dx}\, y(x) = -\frac{2\, y(x)\, x}{y(x)^2 - 3\, x^2} \tag{25}$$

> $restart$

> $Ecua := (2\cdot x\cdot y^3 - 6\cdot y^4 + 12\cdot x^2\cdot y) + (3\cdot x^2\cdot y^2 - 24\cdot x\cdot y^3 + 4\cdot x^3 + 4\cdot y)\cdot y' = 0$

$$Ecua := 2\, x\, y(x)^3 - 6\, y(x)^4 + 12\, x^2\, y(x) + \left(3\, x^2\, y(x)^2 - 24\, x\, y(x)^3 + 4\, x^3 + 4\, y(x)\right)\left(\frac{d}{dx}\, y(x)\right) = 0 \tag{26}$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[\_exact, \_rational] \tag{27}$$

> $Mxy := 2\, x\, y^3 - 6\, y^4 + 12\, x^2\, y$

$$Mxy := 2\, x\, y^3 - 6\, y^4 + 12\, x^2\, y \tag{28}$$

> $Nxy := (3\, x^2\, y^2 - 24\, x\, y^3 + 4\, x^3 + 4\, y)$

$$Nxy := 3\, x^2\, y^2 - 24\, x\, y^3 + 4\, x^3 + 4\, y \tag{29}$$

> $IntMx := simplify(int(Mxy, x))$

$$IntMx := x^2\, y^3 - 6\, x\, y^4 + 4\, x^3\, y \tag{30}$$

> $SolGralUno := IntMx + int((Nxy - diff(IntMx, y)), y) = \_C1$

$$SolGralUno := x^2\, y^3 - 6\, x\, y^4 + 4\, x^3\, y + 2\, y^2 = \_C1 \tag{31}$$

> $IntNy := int(Nxy, y)$

$$IntNy := x^2\, y^3 - 6\, x\, y^4 + 4\, x^3\, y + 2\, y^2 \tag{32}$$

> $SolGralDos := IntNy + int((Mxy - diff(IntNy, x)), x) = C1$

$$SolGralDos := x^2\, y^3 - 6\, x\, y^4 + 4\, x^3\, y + 2\, y^2 = C1 \tag{33}$$

>

>

>