> `restart`

>

$$\left(3xy^2 + 2y^3 + 8y\right) + \left(2x^2y + 3xy^2 + 4x\right)\frac{dy}{dx} = 0$$

> $Ecuacion := 3 \cdot x \cdot y(x) \cdot \cdot 2 + 2 \cdot y(x) \cdot \cdot 3 + 8 \cdot y(x) + (2 \cdot x \cdot \cdot 2 \cdot y(x) + 3 \cdot x \cdot y(x) \cdot \cdot 2 + 4 \cdot x)$
> $\quad \cdot diff(y(x), x) = 0$

$$Ecuacion := 3\,x\,y(x)^2 + 2\,y(x)^3 + 8\,y(x) + \left(2\,x^2\,y(x) + 3\,x\,y(x)^2 + 4\,x\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \qquad (1)$$

> $with(DEtools):$
> $odeadvisor(Ecuacion)$

$$[\_rational] \qquad (2)$$

> $FacInt := intfactor(Ecuacion)$

$$FacInt := x \qquad (3)$$

> $NuevaEcuacion := FacInt \cdot lhs(Ecuacion) = FacInt \cdot rhs(Ecuacion)$

$$NuevaEcuacion := x\left(3\,x\,y(x)^2 + 2\,y(x)^3 + 8\,y(x) + \left(2\,x^2\,y(x) + 3\,x\,y(x)^2 \right.\right. \qquad (4)$$

$$\left.\left. + 4\,x\right)\left(\frac{d}{dx}\,y(x)\right)\right) = 0$$

> $odeadvisor(NuevaEcuacion)$

$$[\_exact,\ \_rational] \qquad (5)$$

> $expand(NuevaEcuacion)$

$$3\,x^2\,y(x)^2 + 2\,x\,y(x)^3 + 8\,x\,y(x) + 2\left(\frac{d}{dx}\,y(x)\right)x^3\,y(x) + 3\left(\frac{d}{dx}\,y(x)\right)x^2\,y(x)^2 \qquad (6)$$

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

> $M := 3\,x^2\,y^2 + 2\,x\,y^3 + 8\,x\,y$

$$M := 3\,y^2\,x^2 + 2\,y^3\,x + 8\,x\,y \qquad (7)$$

> $N := 2\,x^3\,y + 3\,x^2\,y^2 + 4\,x^2$

$$N := 2\,x^3\,y + 3\,y^2\,x^2 + 4\,x^2 \qquad (8)$$

> $comprobacion := simplify(diff(M, y) - diff(N, x)) = 0$

$$comprobacion := 0 = 0 \qquad (9)$$

> $IntMx := int(M, x)$

$$IntMx := y^2\,x^3 + y^3\,x^2 + 4\,x^2\,y \qquad (10)$$

> $SolucionGeneral := IntMx + int((N - diff(IntMx, y)), y) = C_1$

$$SolucionGeneral := y^2\,x^3 + y^3\,x^2 + 4\,x^2\,y = C_1 \qquad (11)$$

>

$$x\,y^3{}^2 + x^2\,y^3 + 4x\,y^2 = C_1$$

> restart
> Ecuacion := 2·x·y(x)··2 − 3·y(x)··3 + (7 − 3·x·y(x)··2)·diff (y(x), x) = 0

$$Ecuacion := 2\,x\,y(x)^2 - 3\,y(x)^3 + \left(7 - 3\,x\,y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \qquad (12)$$

> with(DEtools):
> odeadvisor(Ecuacion)

$$[\_rational] \qquad (13)$$

> intfactor(Ecuacion)

$$\frac{1}{y(x)^2} \qquad (14)$$

> M := 2·x·y··2 − 3·y··3

$$M := 2\,x\,y^2 - 3\,y^3 \qquad (15)$$

> N := 7 − 3·x·y²

$$N := 7 - 3\,x\,y^2 \qquad (16)$$

> DerMy := diff (M, y)

$$DerMy := 4\,x\,y - 9\,y^2 \qquad (17)$$

> DerNx := diff (N, x)

$$DerNx := -3\,y^2 \qquad (18)$$

> FIx := simplify$\left(\dfrac{(DerMy - DerNx)}{N}\right)$

$$FIx := -\frac{2\,y\,(2\,x - 3\,y)}{-7 + 3\,x\,y^2} \qquad (19)$$

> FIy := simplify$\left(\dfrac{(DerNx - DerMy)}{M}\right)$

$$FIy := -\frac{2}{y} \qquad (20)$$

> EVS := int$\left(\dfrac{1}{mu}, mu\right)$ = int(FIy, y)

$$EVS := \ln(\mu) = -2\ln(y) \qquad (21)$$

> FactInt := isolate(EVS, mu)

$$FactInt := \mu = \frac{1}{y^2} \qquad (22)$$

> MM := expand(rhs(FactInt)·M); NN := expand(rhs(FactInt)·N)

$$MM := 2\,x - 3\,y$$

$$(23)$$

$$NN := \frac{7}{y^2} - 3x \tag{23}$$

> $comprobacion_2 := diff(MM, y) - diff(NN, x) = 0$

$$comprobacion_2 := 0 = 0 \tag{24}$$

> $SolGral := int(MM, x) + int((NN - diff(int(MM, x), y)), y) = C_1$

$$SolGral := x^2 - 3xy - \frac{7}{y} = C_1 \tag{25}$$

> $Solucion := x^2 - 3xy(x) - \frac{7}{y(x)} = C_1$

$$Solucion := x^2 - 3xy(x) - \frac{7}{y(x)} = C_1 \tag{26}$$

> $EcuaUno := simplify(isolate(diff(Solucion, x), diff(y(x), x)))$

$$EcuaUno := \frac{d}{dx} y(x) = -\frac{(-2x + 3y(x))y(x)^2}{-7 + 3xy(x)^2} \tag{27}$$

> $EcuaDos := isolate(Ecuacion, diff(y(x), x))$

$$EcuaDos := \frac{d}{dx} y(x) = \frac{-2xy(x)^2 + 3y(x)^3}{7 - 3xy(x)^2} \tag{28}$$

> $comprobacion := simplify(rhs(EcuaUno) - rhs(EcuaDos)) = 0$

$$comprobacion := 0 = 0 \tag{29}$$

>