

> restart

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$$\underbrace{2y^2 + 32x^2y + 18xy^4}_{MMMM} + \underbrace{(3xy + 16x^3 + 30x^2y^3)}_{NNNN} \frac{dy}{dx} = 0$$

> Ecuacion := 2·y(x)·2 + 32·x·2·y(x) + 18·x·y(x)·4 + (3·x·y(x) + 16·x·3 + 30·x·2·y(x)·3)·diff(y(x), x) = 0

$$\text{Ecuacion} := 2y(x)^2 + 32x^2y(x) + 18xy(x)^4 + (3xy(x) + 16x^3 + 30x^2y(x)^3) \left( \frac{d}{dx} y(x) \right) = 0 \quad (1)$$

> with(DEtools) :

> odeadvisor(Ecuacion)

[\_rational] (2)

> simplify(intfactor(Ecuacion))

$$\frac{1}{x(y(x) + 8x^2 + 6xy(x)^3)y(x)} \quad (3)$$

> M := 2·y·2 + 32·x·2·y + 18·x·y·4

$$M := 2y^2 + 32x^2y + 18xy^4 \quad (4)$$

> N := 3·x·y + 16·x·3 + 30·x·2·y·3

$$N := 3xy + 16x^3 + 30x^2y^3 \quad (5)$$

> FactInt :=  $\frac{1}{x(y + 8x^2 + 6xy^3)y}$

$$\text{FactInt} := \frac{1}{xy(y + 8x^2 + 6xy^3)} \quad (6)$$

> MM := simplify(FactInt·M)

$$MM := \frac{2(y + 16x^2 + 9xy^3)}{x(y + 8x^2 + 6xy^3)} \quad (7)$$

> NN := simplify(FactInt·N)

$$NN := \frac{3y + 16x^2 + 30xy^3}{y(y + 8x^2 + 6xy^3)} \quad (8)$$

> comprobacion := simplify(diff(MM, y) - diff(NN, x)) = 0

$$\text{comprobacion} := 0 = 0 \quad (9)$$

> IntMMx := int(MM, x)

$$\text{IntMMx} := \ln(y + 8x^2 + 6xy^3) + 2\ln(x) \quad (10)$$

> NNmenosIntMMx := simplify(NN - diff(IntMMx, y))

$$\text{NNmenosIntMMx} := \frac{2}{y} \quad (11)$$

> SolGen := IntMMx + int(NNmenosIntMMx, y) = C<sub>1</sub>

$$\text{SolGen} := \ln(y + 8x^2 + 6xy^3) + 2\ln(x) + 2\ln(y) = C_1 \quad (12)$$

> SolucionGeneral := expand(exp(lhs(SolGen))) = C<sub>1</sub>

(13)

$$SolucionGeneral := x^2 y^3 + 8 x^4 y^2 + 6 x^3 y^5 = C_1 \quad (13)$$

> restart

$$242. (2xy^2 - 3y^3) dx + (7 - 3xy^2) dy = 0, \quad \mu = \varphi(y).$$

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

$$Ecuacion := 2 x y(x)^2 - 3 y(x)^3 + (7 - 3 x y(x)^2) \left( \frac{d}{dx} y(x) \right) = 0 \quad (14)$$

> with(DEtools) :

> odeadvisor(Ecuacion)

$$[_{rational}] \quad (15)$$

> intfactor(Ecuacion)

$$\frac{1}{y(x)^2} \quad (16)$$

> FactInt :=  $\frac{1}{y^2}$

$$FactInt := \frac{1}{y^2} \quad (17)$$

> M := 2·x·y·2 - 3·y·3

$$M := 2 x y^2 - 3 y^3 \quad (18)$$

> N := 7 - 3·x·y·2

$$N := 7 - 3 x y^2 \quad (19)$$

> comprobacion<sub>1</sub> := simplify(diff(M, y) - diff(N, x)) = 0

$$comprobacion_1 := 4 x y - 6 y^2 = 0 \quad (20)$$

> MM := expand(M·FactInt)

$$MM := 2 x - 3 y \quad (21)$$

> NN := expand(N·FactInt)

$$NN := \frac{7}{y^2} - 3 x \quad (22)$$

> comprobacion<sub>2</sub> := simplify(diff(MM, y) - diff(NN, x)) = 0

$$comprobacion_2 := 0 = 0 \quad (23)$$

> SolGral := int(MM, x) + int((NN - diff(int(MM, x), y)), y) = C<sub>1</sub>

$$SolGral := x^2 - 3 x y - \frac{7}{y} = C_1 \quad (24)$$

> EcuaFactorInt := int( $\frac{1}{\mu}$ , mu) = int( $\frac{diff(N, x) - diff(M, y)}{M}$ , y)

$$EcuaFactorInt := \ln(\mu) = -2 \ln(y) \quad (25)$$

> FactorIntegrante := isolate(EcuaFactorInt, mu)

$$FactorIntegrante := \mu = \frac{1}{y^2} \quad (26)$$

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