> *restart*

> $$-3y^{4/3} + 2y\frac{dy}{dx} = 0$$

> $Ecuacion := -3 \cdot y(x) \cdot \cdot \left(\dfrac{4}{3}\right) + 2 \cdot y(x) \cdot diff(y(x), x) = 0$

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

> $Sol := dsolve(Ecuacion)$

$$Sol := y(x)^{2/3} - x - \_C1 = 0 \tag{2}$$

> $Solucion := lhs(Sol) + (x + \_C1) = rhs(Sol) + (x + \_C1)$

$$Solucion := y(x)^{2/3} = x + \_C1 \tag{3}$$

> $Soluciongeneral := lhs(Solucion) \cdot \cdot 3 = rhs(Solucion) \cdot \cdot 3$

$$Soluciongeneral := y(x)^2 = (x + \_C1)^3 \tag{4}$$

> *restart*

> **313.** $(xy' + y)^2 = y^2 y'; \quad y(C - x) = C^2.$

> $Ecuacion := (x \cdot y' + y) \cdot \cdot 2 = y \cdot \cdot 2 \cdot y'$

$$Ecuacion := \left(x\left(\frac{d}{dx}\,y(x)\right) + y(x)\right)^2 = y(x)^2\left(\frac{d}{dx}\,y(x)\right) \tag{5}$$

> $Sol := dsolve(Ecuacion) : Sol_1$

$$y(x) = 4\,x \tag{6}$$

> $Comprobacion_1 := simplify\big(eval\big(subs\big(y(x) = rhs(Sol_1), lhs(Ecuacion) - rhs(Ecuacion)$
$$= 0\big)\big)\big)$$

$$Comprobacion_1 := 0 = 0 \tag{7}$$

> $SolGral := y(x) \cdot (C_1 - x) = C_1 \cdot \cdot 2$

$$SolGral := y(x)\,(C_1 - x) = C_1^2 \tag{8}$$

> $SolPart := subs(C_1 = 1, SolGral)$

$$SolPart := y(x)\,(1 - x) = 1 \tag{9}$$

> $Parametro := solve(rhs(Sol_1) = rhs(SolGral), C_1)$

$$Parametro := 2\sqrt{x}, \, -2\sqrt{x} \tag{10}$$

> $ParametroDos := solve(rhs(SolPart) = rhs(SolGral), C_1)$

$$ParametroDos := -1, 1 \tag{11}$$

> *restart*

> **149.** $y' = \dfrac{2xy}{3x^2 - y^2}$

> $Ecuacion := y' = \dfrac{2 \cdot x \cdot y}{3 \cdot x \cdot \cdot 2 - y \cdot \cdot 2}$

$$Ecuacion := \frac{\mathrm{d}}{\mathrm{d}x}\, y(x) = \frac{2\, x\, y(x)}{3\, x^2 - y(x)^2} \tag{12}$$

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

$$[\,[\_homogeneous, class\ A],\ \_rational,\ \_dAlembert\,] \tag{13}$$

> $simplify(expand(intfactor(Ecuacion)))$

$$\frac{-3\, x^2 + y(x)^2}{y(x)\,\left(-x^2 + y(x)^2\right)} \tag{14}$$

> $EcuaVarSep := simplify(isolate(eval(subs(y(x) = v(x)\cdot x, Ecuacion)), diff(v(x), x)))$

$$EcuaVarSep := \frac{\mathrm{d}}{\mathrm{d}x}\, v(x) = -\frac{v(x)\,\left(-1 + v(x)^2\right)}{x\,\left(-3 + v(x)^2\right)} \tag{15}$$

> $P := \dfrac{1}{x};\ Q := \dfrac{1}{-\dfrac{v\,\left(-1 + v^2\right)}{\left(-3 + v^2\right)}}$

$$P := \frac{1}{x}$$

$$Q := -\frac{-3 + v^2}{v\,\left(-1 + v^2\right)} \tag{16}$$

> $Solucion := int(P, x) = int(Q, v) + \log(C_1)$

$$Solucion := \ln(x) = \ln(v + 1) + \ln(v - 1) - 3\ln(v) + \ln(C_1) \tag{17}$$

> $SolucionGeneral := expand\left(isolate\left(subs\left(v = \frac{y}{x}, Solucion\right), C_1\right)\right)$

$$SolucionGeneral := C_1 = -\frac{y^3}{(x - y)\,(x + y)} \tag{18}$$

> $restart$
> $Ecuacion := -2 \cdot x \cdot y + (3 \cdot x \cdot \cdot 2 - y \cdot \cdot 2) \cdot y' = 0$

$$Ecuacion := -2\, x\, y(x) + \left(3\, x^2 - y(x)^2\right)\left(\frac{\mathrm{d}}{\mathrm{d}x}\, y(x)\right) = 0 \tag{19}$$

> $FactInt := \dfrac{1}{y(x) \cdot \cdot 4}$

$$FactInt := \frac{1}{y(x)^4} \tag{20}$$

> $EcuacionExacta := lhs(Ecuacion) \cdot FactInt = 0$

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$$EcuacionExacta := \frac{-2\,x\,y(x) + \left(3\,x^2 - y(x)^2\right)\left(\dfrac{d}{dx}\,y(x)\right)}{y(x)^4} = 0 \tag{21}$$

> `with(DEtools) :`
> `odeadvisor(EcuacionExacta)`
$$[\,[\_homogeneous,\ class\ A\,],\ \_exact,\ \_rational,\ \_dAlembert\,] \tag{22}$$

> $M := -\dfrac{2 \cdot x \cdot y}{y \cdot \cdot 4}; N := \dfrac{(3 \cdot x \cdot \cdot 2 - y \cdot \cdot 2)}{y \cdot \cdot 4}$

$$M := -\frac{2\,x}{y^3}$$

$$N := \frac{3\,x^2 - y^2}{y^4} \tag{23}$$

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

$$IntMx := -\frac{x^2}{y^3} \tag{24}$$

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

$$SolucionGeneral := -\frac{x^2}{y^3} + \frac{1}{y} = C_1 \tag{25}$$

> $SolDos := C_1 = -\dfrac{y^3}{(x - y)(x + y)}$

$$SolDos := C_1 = -\frac{y^3}{(x - y)(x + y)} \tag{26}$$

> $SolucionGeneralDos := \dfrac{1}{rhs(SolDos)} = C_1$

$$SolucionGeneralDos := -\frac{(x - y)(x + y)}{y^3} = C_1 \tag{27}$$

> $Comprobacion := simplify(lhs(SolucionGeneral) - lhs(SolucionGeneralDos)) = 0$
$$Comprobacion := 0 = 0 \tag{28}$$