> restart

> $Ecua := (\mathrm{sqrt}(x\cdot\cdot 2 - y(x)\cdot\cdot 2) + y(x)) - x\cdot diff(y(x), x) = 0$

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

> $SolGralUno := dsolve(Ecua)$

$$SolGralUno := -\arctan\left(\frac{y(x)}{\sqrt{x^2 - y(x)^2}}\right) + \ln(x) - \_C1 = 0 \quad (2)$$

> $SolGralDos := simplify(isolate(SolGralUno, y(x)))$

$$SolGralDos := y(x) = -\frac{\sin(-\ln(x) + \_C1)\sqrt{x^2\cos(-\ln(x) + \_C1)^2}}{\cos(-\ln(x) + \_C1)} \quad (3)$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \quad (4)$$

> $EcuaDos := expand(eval(subs(y(x) = v(x)\cdot x, Ecua)))$

$$EcuaDos := \sqrt{x^2 - v(x)^2 x^2} - \left(\frac{d}{dx}\, v(x)\right) x^2 = 0 \quad (5)$$

> $odeadvisor(EcuaDos)$

$$[[\_homogeneous, class\ G], \_rational] \quad (6)$$

> $EcuaTres := x\cdot\mathrm{sqrt}(1 - v(x)\cdot\cdot 2) - x\cdot\cdot 2\cdot diff(v(x), x) = 0$

$$EcuaTres := x\sqrt{1 - v(x)^2} - \left(\frac{d}{dx}\, v(x)\right) x^2 = 0 \quad (7)$$

> $odeadvisor(EcuaTres)$

$$[\_separable] \quad (8)$$

> $SolGralTres := subs\left(v(x) = \frac{y(x)}{x}, separablesol(EcuaTres)\right)$

$$SolGralTres := \left\{\frac{y(x)}{x} = \sin(\ln(x) + \_C1)\right\} \quad (9)$$

> $SolGral := isolate(SolGralTres[1], y(x))$

$$SolGral := y(x) = \sin(\ln(x) + \_C1)\, x \quad (10)$$

> $P := x;\ Q := \sqrt{1 - v^2};\ R := -x\cdot\cdot 2;\ S := 1$

$$P := x$$
$$Q := \sqrt{-v^2 + 1}$$
$$R := -x^2$$
$$S := 1 \quad (11)$$

> $SolGralCuatro := isolate\left(subs\left(v = \frac{y}{x}, int\left(\frac{P}{R}, x\right) + int\left(\frac{S}{Q}, v\right)\right) = C, y\right)$

$$SolGralCuatro := y = \sin(C + \ln(x))\, x \quad (12)$$

> restart

> $Ecua := p(x)\cdot y(x) + diff(y(x), x) = 0$

(13)

$$Ecua := p(x)\, y(x) + \frac{d}{dx}\, y(x) = 0 \tag{13}$$

> $SolGral := dsolve(Ecua)$

$$SolGral := y(x) = \_C1\, e^{\int (-p(x))\, dx} \tag{14}$$

> $MM := p(x)\, y$

$$MM := p(x)\, y \tag{15}$$

> $NN := 1$

$$NN := 1 \tag{16}$$

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

$$ComprobacionUno := p(x) = 0 \tag{17}$$

> $SolGraLFactor := Int\left(\frac{1}{\mathrm{mu}}, \mathrm{mu}\right) = Int\left(\frac{diff(MM, y) - diff(NN, x)}{NN}, x\right)$

$$SolGraLFactor := \int \frac{1}{\mu}\, d\mu = \int p(x)\, dx \tag{18}$$

> $SolGralFacInt := int\left(\frac{1}{\mathrm{mu}}, \mathrm{mu}\right) = int\left(\frac{diff(MM, y) - diff(NN, x)}{NN}, x\right)$

$$SolGralFacInt := \ln(\mu) = \int p(x)\, dx \tag{19}$$

> $FactInt := isolate(SolGralFacInt, \mathrm{mu})$

$$FactInt := \mu = e^{\int p(x)\, dx} \tag{20}$$

> $Ecua$

$$p(x)\, y(x) + \frac{d}{dx}\, y(x) = 0 \tag{21}$$

> $EcuaExacta := rhs(FactInt) \cdot (Ecua)$

$$EcuaExacta := e^{\int p(x)\, dx} \left(p(x)\, y(x) + \frac{d}{dx}\, y(x)\right) = 0 \tag{22}$$

> $with(DEtools):$

> $odeadvisor(EcuaExacta)$

$$[\_separable] \tag{23}$$

> $separablesol(EcuaExacta)$

$$\left\{ y(x) = \frac{e^{-\left(\int p(x)\, dx\right)}}{\_C1} \right\} \tag{24}$$

> $MM := e^{\int p(x)\, dx}\, (p(x)\, y)$

$$MM := e^{\int p(x)\, dx}\, p(x)\, y \tag{25}$$

> $NN := e^{\int p(x)\, dx}$

$$NN := e^{\int p(x)\, dx} \tag{26}$$

> $SolGralCinco := int(MM, x) + int((NN - diff(int(MM, x), y)), y) = C$

$$SolGralCinco := y\,\mathrm{e}^{\int p(x)\,\mathrm{d}x} = C \quad \textbf{(27)}$$

> $SolGralSeis := isolate(SolGralCinco, y)$

$$SolGralSeis := y = \frac{C}{\mathrm{e}^{\int p(x)\,\mathrm{d}x}} \quad \textbf{(28)}$$

>