

```

> restart
> Ecua := (sqrt(x·2 - y(x)·2) + y(x)) - x·diff(y(x), x) = 0
      Ecua := sqrt(x^2 - y(x)^2) + y(x) - x ( d/dx y(x) ) = 0 (1)
> with(DEtools) :
> Tipo := odeadvisor(Ecua)
      Tipo := [_homogeneous, class A], _rational, _dAlembert (2)
> EcuaDos := subs(y(x) = u(x)·x, Ecua)
      EcuaDos := sqrt(x^2 - u(x)^2 x^2) + u(x) x - x ( d/dx (u(x) x) ) = 0 (3)
> TipoDos := odeadvisor(EcuaDos)
      TipoDos := [_homogeneous, class G], _rational (4)
> EcuaTres := simplify(isolate(EcuaDos, diff(u(x), x)))
      EcuaTres := d/dx u(x) = sqrt(-x^2 (u(x)^2 - 1)) / x^2 (5)
> EcuaCuatro := d/dx u(x) = x·sqrt(-(u(x)^2 - 1)) / x^2
      EcuaCuatro := d/dx u(x) = sqrt(-u(x)^2 + 1) / x (6)
> SolucionGeneral := int(1 / sqrt(-u^2 + 1), u) = int(1/x, x) + C[1]
      SolucionGeneral := arcsin(u) = ln(x) + C1 (7)
> SolGralDos := subs(u = y(x)/x, SolucionGeneral)
      SolGralDos := arcsin(y(x)/x) = ln(x) + C1 (8)
> SolGralTres := isolate(SolGralDos, y(x))
      SolGralTres := y(x) = sin(ln(x) + C1) x (9)
> Comprobacion := simplify(eval(subs(y(x) = rhs(SolGralTres), Ecua)))
      Comprobacion := -x cos(ln(x) + C1) + sqrt(x^2 cos(ln(x) + C1)^2) = 0 (10)
> ComprobacionDos := lhs(Comprobacion) - (-x cos(ln(x) + C1)) = rhs(Comprobacion) - (-x cos(ln(x) + C1))
      ComprobacionDos := sqrt(x^2 cos(ln(x) + C1)^2) = x cos(ln(x) + C1) (11)
> CompTres := lhs(ComprobacionDos)·2 = rhs(ComprobacionDos)·2
      CompTres := x^2 cos(ln(x) + C1)^2 = x^2 cos(ln(x) + C1)^2 (12)
> CompCuatro := lhs(CompTres) - rhs(CompTres) = 0
      CompCuatro := 0 = 0 (13)
> restart

```

$$\begin{aligned} &> \text{Ecua} := \text{diff}(y(x), x) = \frac{2 \cdot x \cdot y(x)}{(3 \cdot x \cdot 2 - y(x) \cdot 2)} \\ &\quad \text{Ecua} := \frac{d}{dx} y(x) = \frac{2 x y(x)}{3 x^2 - y(x)^2} \end{aligned} \quad (14)$$

$\text{with(DEtools)} :$

$$\begin{aligned} &> \text{Tipo} := \text{odeadvisor}(\text{Ecua}) \\ &\quad \text{Tipo} := [[_homogeneous, class A], _rational, _dAlembert] \end{aligned} \quad (15)$$

$$\begin{aligned} &> \text{EcuaDos} := \text{simplify}(\text{expand}(\text{isolate}(\text{eval}(\text{subs}(y(x) = u(x) \cdot x, \text{Ecua})), \text{diff}(u(x), x)))) \\ &\quad \text{EcuaDos} := \frac{d}{dx} u(x) = -\frac{u(x) (u(x)^2 - 1)}{x (u(x)^2 - 3)} \end{aligned} \quad (16)$$

$$\begin{aligned} &> \text{SolGral} := \text{int}\left(\frac{1}{\frac{u(u^2 - 1)}{(u^2 - 3)}}, u\right) = \text{int}\left(-\frac{1}{x}, x\right) + \log(C[1]) \\ &\quad \text{SolGral} := 3 \ln(u) - \ln(u + 1) - \ln(u - 1) = -\ln(x) + \ln(C_1) \end{aligned} \quad (17)$$

$$\begin{aligned} &> \text{SolGralDos} := \text{subs}\left(u = \frac{y(x)}{x}, \text{SolGral}\right) \\ &\quad \text{SolGralDos} := 3 \ln\left(\frac{y(x)}{x}\right) - \ln\left(\frac{y(x)}{x} + 1\right) - \ln\left(\frac{y(x)}{x} - 1\right) = -\ln(x) + \ln(C_1) \end{aligned} \quad (18)$$

$$\begin{aligned} &> \text{DerSolGralDos} := \text{simplify}(\text{isolate}(\text{diff}(\text{SolGralDos}, x), \text{diff}(y(x), x))) \\ &\quad \text{DerSolGralDos} := \frac{d}{dx} y(x) = -\frac{2 x y(x)}{y(x)^2 - 3 x^2} \end{aligned} \quad (19)$$

$$\begin{aligned} &> \text{DerEcua} := \text{isolate}(\text{Ecua}, \text{diff}(y(x), x)) \\ &\quad \text{DerEcua} := \frac{d}{dx} y(x) = \frac{2 x y(x)}{3 x^2 - y(x)^2} \end{aligned} \quad (20)$$

>

>