```
> restart
> Ecua := x·sqrt(1 + y(x)^2) + y(x)·sqrt(1 + x^2)·diff(y(x), x) = 0
```

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

```
> with(DEtools) :
> odeadvisor(Ecua)
```

$$[\_separable] \quad (2)$$

```
> M := x sqrt(1 + y^2)
```

$$M := x\sqrt{y^2+1} \quad (3)$$

```
> N := y sqrt(x^2 + 1)
```

$$N := y\sqrt{x^2+1} \quad (4)$$

```
> P := x; Q := sqrt(y^2 + 1);
```

$$P := x$$

$$Q := \sqrt{y^2+1} \quad (5)$$

```
> R := sqrt(x^2 + 1); S := y
```

$$R := \sqrt{x^2+1}$$

$$S := y \quad (6)$$

```
> Sol := int(P/R, x) + int(S/Q, y) = _C1
```

$$Sol := \sqrt{x^2+1} + \sqrt{y^2+1} = \_C1 \quad (7)$$

```
> SolGral := sqrt(x^2 + 1) + sqrt(y(x)^2 + 1) = _C1
```

$$SolGral := \sqrt{x^2+1} + \sqrt{1+y(x)^2} = \_C1 \quad (8)$$

```
> Ecua
```

$$x\sqrt{1+y(x)^2} + y(x)\sqrt{x^2+1}\left(\frac{d}{dx}y(x)\right) = 0 \quad (9)$$

```
> DerEcua := isolate(Ecua, diff(y(x), x))
```

$$DerEcua := \frac{d}{dx}y(x) = -\frac{x\sqrt{1+y(x)^2}}{y(x)\sqrt{x^2+1}} \quad (10)$$

```
> DerSol := isolate(diff(SolGral, x), diff(y(x), x))
```

$$DerSol := \frac{d}{dx}y(x) = -\frac{x\sqrt{1+y(x)^2}}{y(x)\sqrt{x^2+1}} \quad (11)$$

```
> Comp := rhs(DerSol) - rhs(DerEcua) = 0
```

$$Comp := 0 = 0 \quad (12)$$

```
> restart
> Ecua := sqrt(x^2 - y(x)^2) + y(x) - x·diff(y(x), x) = 0
```

$$Ecua := \sqrt{x^2-y(x)^2} + y(x) - x\left(\frac{d}{dx}y(x)\right) = 0 \quad (13)$$

```
> with(DEtools) :
> odeadvisor(Ecua)
```

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \tag{14}$$

```
> EcuaDos := simplify(isolate(eval(subs(y(x) = x·u(x), Ecua)), diff(u(x), x)))
```

$$EcuaDos := \frac{d}{dx}u(x) = \frac{\sqrt{-x^2\left(u(x)^2-1\right)}}{x^2} \tag{15}$$

```
> EcuaTres := lhs(EcuaDos)^2·x^2 = rhs(EcuaDos)^2·x^2
```

$$EcuaTres := \left(\frac{d}{dx}u(x)\right)^2 x^2 = -u(x)^2+1 \tag{16}$$

```
> EcuaCuatro := isolate(diff(u(x), x)·x = sqrt(rhs(EcuaTres)), diff(u(x), x))
```

$$EcuaCuatro := \frac{d}{dx}u(x) = \frac{\sqrt{-u(x)^2+1}}{x} \tag{17}$$

```
> odeadvisor(EcuaCuatro)
```

$$[\_separable] \tag{18}$$

```
> P := 1/x; Q := 1/sqrt(-u^2+1)
```

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

$$Q := \frac{1}{\sqrt{-u^2+1}} \tag{19}$$

```
> Sol := int(P, x) - int(Q, u) = _C1
```

$$Sol := \ln(x) - \arcsin(u) = \_C1 \tag{20}$$

```
> SolGral := subs(u = y/x, Sol)
```

$$SolGral := \ln(x) - \arcsin\left(\frac{y}{x}\right) = \_C1 \tag{21}$$

```
> SolGralDos := ln(x) - arcsin(y(x)/x) = _C1
```

$$SolGralDos := \ln(x) - \arcsin\left(\frac{y(x)}{x}\right) = \_C1 \tag{22}$$

```
> DerSol := simplify(isolate(diff(SolGralDos, x), diff(y(x), x)))
```

$$DerSol := \frac{d}{dx}y(x) = \frac{\sqrt{-\frac{y(x)^2-x^2}{x^2}}\,x + y(x)}{x} \tag{23}$$

```
> DerEcua := isolate(Ecua, diff(y(x), x))
```

$$DerEcua := \frac{d}{dx}y(x) = -\frac{-\sqrt{x^2-y(x)^2}-y(x)}{x} \tag{24}$$

```
> Comp := simplify(rhs(DerSol) - rhs(DerEcua))·x = 0
```

$$Comp := \sqrt{-\frac{y(x)^2-x^2}{x^2}}\,x - \sqrt{x^2-y(x)^2} = 0 \tag{25}$$

> $CompDos := \left(\frac{lhs(Comp) + \sqrt{x^2 - y(x)^2}}{x} \right)^2 = \left(\frac{rhs(Comp) + \sqrt{x^2 - y(x)^2}}{x} \right)^2$

$$CompDos := -\frac{y(x)^2 - x^2}{x^2} = \frac{x^2 - y(x)^2}{x^2} \quad \textbf{(26)}$$

> $CompTres := simplify(lhs(CompDos) - rhs(CompDos)) = 0$

$$CompTres := 0 = 0 \quad \textbf{(27)}$$

> *restart*

>