```
> restart
> Ecua := (2 ·x··3 + x·y(x)··2) + (x··2·y(x) + 2·y(x)··3)·diff(y(x), x) = 0
```
$$Ecua := 2\,x^3 + x\,y(x)^2 + \left(x^2\,y(x) + 2\,y(x)^3\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \qquad (1)$$

```
> with(DEtools):
> Tipo := odeadvisor(Ecua)
```
$$Tipo := [[\_homogeneous,\ class\ A],\ \_exact,\ \_rational,\ \_dAlembert] \qquad (2)$$

```
> M := (2 ·x··3 + x·y··2)
```
$$M := 2\,x^3 + x\,y^2 \qquad (3)$$

```
> N := (x··2·y + 2·y··3)
```
$$N := x^2\,y + 2\,y^3 \qquad (4)$$

```
> Comprobar := diff(M, y) − diff(N, x) = 0
```
$$Comprobar := 0 = 0 \qquad (5)$$

```
> IntMx := int(M, x)
```
$$IntMx := \frac{1}{2}\,x^4 + \frac{1}{2}\,x^2\,y^2 \qquad (6)$$

```
> SolGral := IntMx + int((N − diff(IntMx, y)), y) = C[1]
```
$$SolGral := \frac{1}{2}\,x^4 + \frac{1}{2}\,x^2\,y^2 + \frac{1}{2}\,y^4 = C_1 \qquad (7)$$

```
> SolGralDos := lhs(SolGral)·2 = C[1]
```
$$SolGralDos := x^4 + x^2\,y^2 + y^4 = C_1 \qquad (8)$$

```
> SolGralTres := x··4 + x··2·y(x)··2 + y(x)··4 = C[1]
```
$$SolGralTres := x^4 + x^2\,y(x)^2 + y(x)^4 = C_1 \qquad (9)$$

```
> DerSolGral := simplify(isolate(diff(SolGralTres, x), diff(y(x), x)))
```
$$DerSolGral := \frac{d}{dx}\,y(x) = -\frac{x\left(y(x)^2 + 2\,x^2\right)}{y(x)\left(2\,y(x)^2 + x^2\right)} \qquad (10)$$

```
> DerEcua := isolate(Ecua, diff(y(x), x))
```
$$DerEcua := \frac{d}{dx}\,y(x) = \frac{-2\,x^3 - x\,y(x)^2}{x^2\,y(x) + 2\,y(x)^3} \qquad (11)$$

```
> ComprobacionDos := simplify(rhs(DerSolGral) − rhs(DerEcua)) = 0
```
$$ComprobacionDos := 0 = 0 \qquad (12)$$

```
> restart
> Ecua := (2·y(x)··2 + 4·y(x)··3) + (16·x··2) + (2·x·y(x) + 6·x·y(x)··2)·diff(y(x), x) = 0
```
$$Ecua := 2\,y(x)^2 + 4\,y(x)^3 + 16\,x^2 + \left(2\,x\,y(x) + 6\,x\,y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \qquad (13)$$

```
> with(DEtools):
> Tipo := odeadvisor(Ecua)
```
$$Tipo := [\_rational] \qquad (14)$$

```
> FactInt := intfactor(Ecua)
```
$$FactInt := x \qquad (15)$$

```
> EcuaExacta := expand(FactInt·lhs(Ecua)) = 0
```
$$(16)$$

$EcuaExacta := 2\,x\,y(x)^2 + 4\,x\,y(x)^3 + 16\,x^3 + 2\left(\dfrac{d}{dx}\,y(x)\right)x^2\,y(x) + 6\left(\dfrac{d}{dx}\,y(x)\right)x^2\,y(x)^2$ **(16)**

$\quad = 0$

> $TipoDos := odeadvisor(EcuaExacta)$

$$TipoDos := [\_exact, \_rational]$$ **(17)**

> $MM := 2\,x\,y^2 + 4\,x\,y^3 + 16\,x^3$

$$MM := 4\,x\,y^3 + 16\,x^3 + 2\,x\,y^2$$ **(18)**

> $NN := 2\,x^2\,y + 6\,x^2\,y^2$

$$NN := 6\,x^2\,y^2 + 2\,x^2\,y$$ **(19)**

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

$$Comprobacion := 0 = 0$$ **(20)**

>