```
> restart
> Ecua := 4·x^3·y^3 + 2·x·y^2 - 6·y^3 + (3·x^4·y^2 + 2·x^2·y - 18·x·y^2 + 16·y)·y' = 0
```

$$Ecua := 4x^3y(x)^3 + 2xy(x)^2 - 6y(x)^3 + \left(3x^4y(x)^2 + 2x^2y(x) - 18xy(x)^2 + 16y(x)\right)\left(\frac{d}{dx}y(x)\right) = 0 \quad (1)$$

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

$$[\_exact, \_rational, [\_Abel, 2nd\ type, class\ B]] \quad (2)$$

```
> M := 4*x^3*y^3 + 2*x*y^2 - 6*y^3
```

$$M := 4y^3x^3 + 2xy^2 - 6y^3 \quad (3)$$

```
> N := (3*x^4*y^2 + 2*x^2*y - 18*x*y^2 + 16*y)
```

$$N := 3x^4y^2 + 2x^2y - 18xy^2 + 16y \quad (4)$$

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

$$IntMx := 2y^2\left(\frac{1}{2}x^4y + \frac{1}{2}x^2 - 3xy\right) \quad (5)$$

```
> SolGralUno := expand(IntMx + int((N - diff(IntMx, y)), y)) = _C1
```

$$SolGralUno := x^4y^3 + x^2y^2 - 6xy^3 + 8y^2 = \_C1 \quad (6)$$

```
> IntNy := int(N, y)
```

$$IntNy := \frac{(3x^4 - 18x)y^3}{3} + \frac{(2x^2 + 16)y^2}{2} \quad (7)$$

```
> SolGralDos := expand(IntNy + int((M - diff(IntNy, x)), x)) = _C1
```

$$SolGralDos := x^4y^3 + x^2y^2 - 6xy^3 + 8y^2 = \_C1 \quad (8)$$

```
> restart
> M := 4*x^3*y^3 + 2*x*y^2 - 6*y^3
```

$$M := 4x^3y^3 + 2xy^2 - 6y^3 \quad (9)$$

```
> N := (3*x^4*y^2 + 2*x^2*y - 18*x*y^2 + 16*y)
```

$$N := 3x^4y^2 + 2x^2y - 18xy^2 + 16y \quad (10)$$

```
> ExpresionIntegral := Int(M, x) = int(M, x)
```

$$ExpresionIntegral := \int\left(4x^3y^3 + 2xy^2 - 6y^3\right)dx = 2y^2\left(\frac{1}{2}x^4y + \frac{1}{2}x^2 - 3yx\right) \quad (11)$$

```
> ExpresionDerivada := Diff(M, y) = diff(M, y)
```

$$ExpresionDerivada := \frac{\partial}{\partial y}\left(4x^3y^3 + 2xy^2 - 6y^3\right) = 12x^3y^2 + 4yx - 18y^2 \quad (12)$$

```
> diff·(x^2, x)
```

$$diff\left(x^2, x\right) \quad (13)$$

```
> restart
> EcuaNva := (4·x^3·y^2 + 2·x·y - 6·y^2) + (3·x^4·y + 2·x^2 - 18·x·y + 16)·y' = 0
```

$$EcuaNva := 4x^3y(x)^2 + 2xy(x) - 6y(x)^2 + \left(3x^4y(x) + 2x^2 - 18xy(x) + 16\right)\left(\frac{d}{dx}y(x)\right) \quad (14)$$

$= 0$

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

$$[\_rational, [\_Abel, 2nd\ type, class\ B]] \tag{15}$$

```
> FI := intfactor(EcuaNva)
```

$$FI := y(x) \tag{16}$$

```
> M := 4*x^3*y^2 + 2*x*y - 6*y^2
```

$$M := 4x^3y^2 + 2xy - 6y^2 \tag{17}$$

```
> N := (3*x^4*y + 2*x^2 - 18*x*y + 16)
```

$$N := 3x^4y + 2x^2 - 18xy + 16 \tag{18}$$

```
> DerMy := diff(M, y)
```

$$DerMy := 8x^3y + 2x - 12y \tag{19}$$

```
> DerNx := diff(N, x)
```

$$DerNx := 12x^3y + 4x - 18y \tag{20}$$

```
> EcuaFactInt := simplify(isolate(mu(y)·DerMy + M·diff(mu(y), y) = mu(y)·DerNx,
      diff(mu(y), y)))
```

$$EcuaFactInt := \frac{d}{dy}\mu(y) = \frac{\mu(y)}{y} \tag{21}$$

```
> SolFactInt := dsolve(EcuaFactInt)
```

$$SolFactInt := \mu(y) = c_1 y \tag{22}$$

```
> FactInt := subs(c[1] = 1, SolFactInt)
```

$$FactInt := \mu(y) = y \tag{23}$$

```
> MM := subs(y = y(x), expand(rhs(FactInt)·M))
```

$$MM := 4y(x)^3x^3 + 2y(x)^2x - 6y(x)^3 \tag{24}$$

```
> NN := subs(y = y(x), expand(rhs(FactInt)·N))
```

$$NN := 3x^4y(x)^2 + 2x^2y(x) - 18y(x)^2x + 16y(x) \tag{25}$$

```
> EcuaExacta := MM + NN·y' = 0
```

$$EcuaExacta := 4y(x)^3x^3 + 2y(x)^2x - 6y(x)^3 + (3x^4y(x)^2 + 2x^2y(x) - 18y(x)^2x + 16y(x))\left(\frac{d}{dx}y(x)\right) = 0 \tag{26}$$

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

$$[\_exact, \_rational, [\_Abel, 2nd\ type, class\ B]] \tag{27}$$

```
> restart
>
```