> *restart*

> **93.** $(xy^2 - y^2 + x - 1)\,dx + (x^2y - 2xy + x^2 + 2y - 2x + 2)\,dy = 0.$

> $Ecuacion := (x \cdot y(x) \cdot\cdot 2 - y(x) \cdot\cdot 2 + x - 1) + (x \cdot\cdot 2 \cdot y(x) - 2 \cdot x \cdot y(x) + x \cdot\cdot 2 + 2 \cdot y(x) - 2 \cdot x + 2) \cdot diff\,(y(x), x) = 0$

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

> $with(DEtools):$
> $odeadvisor(Ecuacion)$

$$[\_separable] \tag{2}$$

> $M := factor(x \cdot y \cdot\cdot 2 - y \cdot\cdot 2 + x - 1)$

$$M := \left(y^2 + 1\right)(x - 1) \tag{3}$$

> $N := factor(x \cdot\cdot 2 \cdot y - 2 \cdot x \cdot y + x \cdot\cdot 2 + 2 \cdot y - 2 \cdot x + 2)$

$$N := \left(x^2 - 2\,x + 2\right)(1 + y) \tag{4}$$

> $P := (x - 1); Q := (y^2 + 1); R := (x^2 - 2\,x + 2); S := (1 + y)$

$$P := x - 1$$
$$Q := y^2 + 1$$
$$R := x^2 - 2\,x + 2$$
$$S := 1 + y \tag{5}$$

> $SolucionGeneral := int\left(\dfrac{P}{R}, x\right) + int\left(\dfrac{S}{Q}, y\right) = C_1$

$$SolucionGeneral := \frac{1}{2}\,\ln(x^2 - 2\,x + 2) + \frac{1}{2}\,\ln(y^2 + 1) + \arctan(y) = C_1 \tag{6}$$

> *restart*

> $\left(4x^3y^3 + 16xy^4 + 8\right) + \left(3x^4y^2 + 32x^2y^3 + 18y^2\right)\dfrac{dy}{dx} = 0$

> $M := 4 \cdot x \cdot\cdot 3 \cdot y \cdot\cdot 3 + 16 \cdot x \cdot y \cdot\cdot 4 + 8$

$$M := 4\,x^3\,y^3 + 16\,x\,y^4 + 8 \tag{7}$$

> $N := 3 \cdot x \cdot\cdot 4 \cdot y \cdot\cdot 2 + 32 \cdot x \cdot\cdot 2 \cdot y \cdot\cdot 3 + 18 \cdot y \cdot\cdot 2$

$$N := 3\,x^4\,y^2 + 32\,x^2\,y^3 + 18\,y^2 \tag{8}$$

> $Comprobar := simplify(diff\,(M, y) - diff\,(N, x)) = 0$

$$Comprobar := 0 = 0 \tag{9}$$

> $Ecuacion := \left(4\,x^3\,y(x)^3 + 16\,x\,y(x)^4 + 8\right) + \left(3\,x^4\,y(x)^2 + 32\,x^2\,y(x)^3 + 18\,y(x)^2\right) \cdot diff\,(y(x), x) = 0$

$$Ecuacion := 4\,x^3\,y(x)^3 + 16\,x\,y(x)^4 + 8 + \left(3\,x^4\,y(x)^2 + 32\,x^2\,y(x)^3 + 18\,y(x)^2\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{10}$$

```
> with(DEtools) :
> odeadvisor(Ecuacion)
```
$$[\_exact, \_rational] \tag{11}$$

```
> M; N;
```
$$4\,x^3\,y^3 + 16\,x\,y^4 + 8$$
$$3\,x^4\,y^2 + 32\,x^2\,y^3 + 18\,y^2 \tag{12}$$

```
> IntM := int(M, x)
```
$$IntM := y^3\,x^4 + 8\,y^4\,x^2 + 8\,x \tag{13}$$

```
> SolucionGeneralUno := IntM + int((N − diff(IntM, y)), y) = C_1
```
$$SolucionGeneralUno := y^3\,x^4 + 8\,y^4\,x^2 + 8\,x + 6\,y^3 = C_1 \tag{14}$$

```
> IntN := int(N, y)
```
$$IntN := 8\,y^4\,x^2 + y^3\,x^4 + 6\,y^3 \tag{15}$$

```
> SolucionGeneralDos := IntN + int((M − diff(IntN, x)), x) = C_1
```
$$SolucionGeneralDos := y^3\,x^4 + 8\,y^4\,x^2 + 8\,x + 6\,y^3 = C_1 \tag{16}$$

```
> restart
```


$$M = 3x^2\tan(y) - \frac{2y^3}{x^3}$$
$$N = x^3\sec^2(y) + 4y^3 + \frac{3y^2}{x^2}$$

```
> Ecuacion := 3·x··2·tan(y(x)) − (2·y(x)··3)/(x··3) + (x··3·sec(y(x))··2 + 4·y(x)··3
       + (3·y(x)··2)/(x··2)) ·diff(y(x), x) = 0
```
$$Ecuacion := 3\,x^2\tan(y(x)) - \frac{2\,y(x)^3}{x^3} + \left(x^3\sec(y(x))^2 + 4\,y(x)^3 + \frac{3\,y(x)^2}{x^2}\right)\left(\frac{d}{dx}\,y(x)\right) \tag{17}$$
$$= 0$$

```
> with(DEtools) :
> odeadvisor(Ecuacion)
```
$$[\_exact] \tag{18}$$

```
> M := 3·x··2·tan(y) − (2·y··3)/(x··3)
```
$$M := 3\,x^2\tan(y) - \frac{2\,y^3}{x^3} \tag{19}$$

> $N := x^3 \sec(y)^2 + 4y^3 + \dfrac{3y^2}{x^2}$

$$N := x^3 \sec(y)^2 + 4y^3 + \frac{3y^2}{x^2} \tag{20}$$

> $IntM := int(M, x)$

$$IntM := x^3 \tan(y) + \frac{y^3}{x^2} \tag{21}$$

> $SolucionGeneral := IntM + int((N - diff(IntM, y)), y) = C_1$

$$SolucionGeneral := \frac{y^3}{x^2} + \frac{x^3 \sin(y)}{\cos(y)} + y^4 = C_1 \tag{22}$$