```
> restart
> Solucion := y(x)··2·(1 - y(x)) = (x - C1)··2
```

$$Solucion := y(x)^2\,(1 - y(x)) = (x - C_1)^2 \tag{1}$$

```
>
> SolucionDos := expand(isolate(Solucion, C1))
```

$$SolucionDos := C_1 = -\sqrt{y(x)^2 - y(x)^3} + x \tag{2}$$

```
>
> Ecuacion := diff(rhs(SolucionDos), x) = 0
```

$$Ecuacion := -\frac{1}{2}\,\frac{2\,y(x)\left(\frac{d}{dx}y(x)\right) - 3\,y(x)^2\left(\frac{d}{dx}y(x)\right)}{\sqrt{y(x)^2 - y(x)^3}} + 1 = 0 \tag{3}$$

```
> EcuacionDos := simplify(lhs(Ecuacion)·sqrt(y(x)^2 - y(x)^3)) = 0
```

$$EcuacionDos := -y(x)\left(\frac{d}{dx}y(x)\right) + \frac{3}{2}\,y(x)^2\left(\frac{d}{dx}y(x)\right) + \sqrt{-y(x)^2\,(-1 + y(x))} = 0 \tag{4}$$

```
> SolucionSingular := y(x) = 1
```

$$SolucionSingular := y(x) = 1 \tag{5}$$

```
> Comprobacion1 := eval(subs(y(x) = rhs(SolucionSingular), EcuacionDos))
```

$$Comprobacion_1 := 0 = 0 \tag{6}$$

```
>
> M := 1
```

$$M := 1 \tag{7}$$

$$M := 1 \tag{8}$$

```
> N := -1/2 (2 y - 3 y^2)/sqrt(y^2 - y^3)
```

$$N := -\frac{1}{2}\,\frac{2\,y - 3\,y^2}{\sqrt{y^2 - y^3}} \tag{9}$$

```
> Comprobar := diff(M, y) - diff(N, x) = 0
```

$$Comprobar := 0 = 0 \tag{10}$$

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

$$[\_quadrature] \tag{11}$$

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

$$IntM := x \tag{12}$$

```
> SolucionGeneral := IntM + int((N - diff(IntM, y)), y) = C1
```

$$SolucionGeneral := x + \frac{y^2\,(-1 + y)}{\sqrt{y^2 - y^3}} = C_1 \tag{13}$$

```
> Solucion
```

$$y(x)^2\,(1 - y(x)) = (x - C_1)^2 \tag{14}$$

> *restart*

> $Solucion := y(x) = \frac{C_1}{x\cdot\cdot 2} + \frac{C_2}{x\cdot\cdot 3}$

$$Solucion := y(x) = \frac{C_1}{x^2} + \frac{C_2}{x^3} \tag{15}$$

> $Sistema := diff(Solucion, x), diff(Solucion, x\$2) : Sistema_1; Sistema_2$

$$\frac{d}{dx} y(x) = -\frac{2\,C_1}{x^3} - \frac{3\,C_2}{x^4}$$

$$\frac{d^2}{dx^2} y(x) = \frac{6\,C_1}{x^4} + \frac{12\,C_2}{x^5} \tag{16}$$

> $Parametro := solve(\{Sistema\}, \{C_1, C_2\}) : Parametro_1; Parametro_2$

$$C_1 = -\frac{1}{2} x^3 \left(\left(\frac{d^2}{dx^2} y(x) \right) x + 4 \left(\frac{d}{dx} y(x) \right) \right)$$

$$C_2 = \left(\frac{d}{dx} y(x) \right) x^4 + \frac{1}{3} \left(\frac{d^2}{dx^2} y(x) \right) x^5 \tag{17}$$

> $EcuacionInicial := simplify(subs(C_1 = rhs(Parametro_1), C_2 = rhs(Parametro_2), Solucion))$

$$EcuacionInicial := y(x) = -\frac{1}{6} x \left(\left(\frac{d^2}{dx^2} y(x) \right) x + 6 \left(\frac{d}{dx} y(x) \right) \right) \tag{18}$$

> $Ecuacion := expand\left(\frac{lhs(EcuacionInicial)}{\left(\frac{x\cdot\cdot 2}{6}\right)} - \frac{rhs(EcuacionInicial)}{\left(\frac{x\cdot\cdot 2}{6}\right)} \right) = 0$

$$Ecuacion := \frac{6\,y(x)}{x^2} + \frac{d^2}{dx^2} y(x) + \frac{6 \left(\frac{d}{dx} y(x) \right)}{x} = 0 \tag{19}$$

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