```
> restart :
>
_C1
> SolucionGeneral := y(x)··2·(1 − y(x)) = (x − _C1)··2;
```

$$SolucionGeneral := y(x)^2\,(1-y(x)) = (x-\_C1)^2 \tag{1}$$

```
> Solucion := isolate(SolucionGeneral, _C1);
```

$$Solucion := \_C1 = -\sqrt{y(x)^2\,(1-y(x))} + x \tag{2}$$

```
> Ecuacion := diff(Solucion, x);
```

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

```
> EcuacionBuscada := simplify(isolate(rhs(Ecuacion) = 0, diff(y(x), x)));
```

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

```
> restart
> EcuacionDiferencial := sin(2·x)/y(x) + x + (y(x) − sin(x)··2/(y(x)··2))·diff(y(x), x) = 0;
```

$$EcuacionDiferencial := \frac{\sin(2\,x)}{y(x)} + x + \left(y(x) - \frac{\sin(x)^2}{y(x)^2}\right)\left(\frac{d}{dx}y(x)\right) = 0 \tag{5}$$

```
> with(DEtools) :
> odeadvisor(EcuacionDiferencial);
```

$$[\_exact] \tag{6}$$

```
> M(x, y) := sin(2·x)/y + x;
```

$$M(x,y) := \frac{\sin(2\,x)}{y} + x \tag{7}$$

```
> N(x, y) := y − sin(x)··2/(y··2);
```

$$N(x,y) := y - \frac{\sin(x)^2}{y^2} \tag{8}$$

```
> DMy := diff(M(x, y), y);
```

$$DMy := -\frac{\sin(2\,x)}{y^2} \tag{9}$$

```
> DNx := diff(N(x, y), x);
```

$$DNx := -\frac{2\sin(x)\cos(x)}{y^2} \tag{10}$$

```
> comprobacion := simplify(DMy − DNx) = 0;
```

$$comprobacion := 0 = 0 \tag{11}$$

```
> restart
> Ecuacion := diff(y(x), x) = 2·x·y(x)/(3·x··2 − y(x)··2);
```

(12)

$$Ecuacion := \frac{d}{dx} y(x) = \frac{2\,x\,y(x)}{3\,x^2 - y(x)^2} \tag{12}$$

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

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \tag{13}$$

```
> intfactor(Ecuacion);
```

$$\frac{-3\,x^2 + y(x)^2}{y(x)\,(-x + y(x))\,(y(x) + x)} \tag{14}$$

```
>
```

COEFICIENTES HOMOGENEOS

```
> EcuacionSeparable := simplify(isolate(eval(subs(y(x) = u(x)·x, Ecuacion)), diff(u(x),
      x)));
```

$$EcuacionSeparable := \frac{d}{dx} u(x) = -\frac{u(x)\,(-1 + u(x)^2)}{x\,(-3 + u(x)^2)} \tag{15}$$

```
> P(u) := u*(-1 + u^2)/(-3 + u^2)
```

$$P(u) := \frac{u\,(-1 + u^2)}{-3 + u^2} \tag{16}$$

```
> R(x) := x;
```

$$R(x) := x \tag{17}$$

```
> SolucionIntermedia := int(1/P(u), u) + int(1/R(x), x) = C1;
```

$$SolucionIntermedia := -\ln(u - 1) - \ln(u + 1) + 3\ln(u) + \ln(x) = C1 \tag{18}$$

```
> Solucion := simplify(subs(u = y/x, SolucionIntermedia));
```

$$Solucion := -\ln\left(-\frac{-y + x}{x}\right) - \ln\left(\frac{y + x}{x}\right) + 3\ln\left(\frac{y}{x}\right) + \ln(x) = C1 \tag{19}$$

```
> SolucionGeneral := simplify(exp(lhs(Solucion))) = C10;
```

$$SolucionGeneral := -\frac{y^3}{-y^2 + x^2} = C10 \tag{20}$$

```
>
```

FACTOR INTEGRANTE

```
> Ecuacion;
```

$$\frac{d}{dx} y(x) = \frac{2\,x\,y(x)}{3\,x^2 - y(x)^2} \tag{21}$$

```
> M(x, y) := -2·x·y;
```

$$M(x, y) := -2\,y\,x \tag{22}$$

```
> N(x, y) := 3*x^2 - y^2;
```

$$N(x, y) := 3\,x^2 - y^2 \tag{23}$$

```
> FacInt := simplify((-3*x^2 + y^2)/(y*(-x + y)*(y + x)))
```

(24)

$$FacInt := \frac{3x^2 - y^2}{y\left(-y^2 + x^2\right)} \tag{24}$$

> $MM(x,y) := simplify(FacInt \cdot M(x,y))$;

$$MM(x,y) := -\frac{2\left(3x^2 - y^2\right)x}{-y^2 + x^2} \tag{25}$$

> $NN(x,y) := simplify(FacInt \cdot N(x,y))$;

$$NN(x,y) := \frac{\left(3x^2 - y^2\right)^2}{y\left(-y^2 + x^2\right)} \tag{26}$$

> $DMMy := simplify(diff(MM(x,y),y))$;

$$DMMy := -\frac{8yx^3}{\left(-y^2 + x^2\right)^2} \tag{27}$$

> $DNNx := simplify(expand(diff(NN(x,y),x)))$;

$$DNNx := \frac{2x\left(-18y^2x^2 + 9x^4 + 5y^4\right)}{y\left(-y^2 + x^2\right)^2} \tag{28}$$

> $restart$:

>