```
> restart
>
```

$$x \ln x \frac{dy}{dx} - y = x^3 (3 \ln x - 1)$$

```
> Ecuacion := x·log(x)·diff(y(x), x) − y(x) = x··3·(3·log(x) − 1)
```

$$Ecuacion := x \ln(x) \left( \frac{d}{dx} y(x) \right) - y(x) = x^3 (3 \ln(x) - 1) \quad (1)$$

```
> EcuacionNormalizada := expand( lhs(Ecuacion) / (x·log(x)) ) = expand( rhs(Ecuacion) / (x·log(x)) )
```

$$EcuacionNormalizada := \frac{d}{dx} y(x) - \frac{y(x)}{x \ln(x)} = 3 x^2 - \frac{x^2}{\ln(x)} \quad (2)$$

```
> p := − 1 / (x ln(x)); q := rhs(EcuacionNormalizada)
```

$$p := -\frac{1}{x \ln(x)}$$

$$q := 3 x^2 - \frac{x^2}{\ln(x)} \quad (3)$$

```
> IntPosP := int(p, x)
```

$$IntPosP := -\ln(\ln(x)) \quad (4)$$

```
> IntNegP := -int(p, x)
```

$$IntNegP := \ln(\ln(x)) \quad (5)$$

```
> ExpNeg := exp(IntNegP); ExpPos := exp(IntPosP)
```

$$ExpNeg := \ln(x)$$

$$ExpPos := \frac{1}{\ln(x)} \quad (6)$$

```
> ExpPosQ := expand(ExpPos·q)
```

$$ExpPosQ := \frac{3 x^2}{\ln(x)} - \frac{x^2}{\ln(x)^2} \quad (7)$$

```
> IntQ := int(ExpPosQ, x)
```

$$IntQ := \frac{x^3}{\ln(x)} \quad (8)$$

```
> SolucionGeneral := y(x) = C1·ExpNeg + ExpNeg·IntQ
```

$$SolucionGeneral := y(x) = C_1 \ln(x) + x^3 \quad (9)$$

```
> Comporbacion1 := dsolve(Ecuacion)
```

$$Comporbacion_1 := y(x) = x^3 + \ln(x) \_C1 \quad (10)$$

```
> Comprobacion2 := simplify(eval(subs(y(x) = rhs(SolucionGeneral), lhs(Ecuacion)
      − rhs(Ecuacion) = 0)))
```

(11)

$$Comprobacion_2 := 0 = 0 \quad (11)$$

```
> restart
```

```
> Ecuacion := y''-6*y'+8*y=0
```

$$Ecuacion := \frac{d^2}{dx^2} y(x) - 6\left(\frac{d}{dx} y(x)\right) + 8\,y(x) = 0 \quad (12)$$

```
> EcuacionCaracteristica := m··2-6·m+8=0
```

$$EcuacionCaracteristica := m^2 - 6\,m + 8 = 0 \quad (13)$$

```
> Raiz := solve(EcuacionCaracteristica)
```

$$Raiz := 4, 2 \quad (14)$$

```
> SolUno := y(x)=exp(Raiz[1]·x); SolDos := y(x)=exp(Raiz[2]·x)
```

$$SolUno := y(x) = e^{4x}$$

$$SolDos := y(x) = e^{2x} \quad (15)$$

```
> SolucionGeneral := y(x)=C[1]·rhs(SolUno)+C[2]·rhs(SolDos)
```

$$SolucionGeneral := y(x) = C_1\,e^{4x} + C_2\,e^{2x} \quad (16)$$

```
> Comprobacion := simplify(eval(subs(y(x)=rhs(SolucionGeneral),Ecuacion)))
```

$$Comprobacion := 0 = 0 \quad (17)$$

```
> Comprobacion[2] := dsolve(Ecuacion)
```

$$Comprobacion_2 := y(x) = \_C1\,e^{4x} + \_C2\,e^{2x} \quad (18)$$

```
>
```