```
> restart
> Ecuacion := diff(y(x), x$3) − 64·y(x) = 0
```

$$Ecuacion := \frac{d^3}{dx^3} y(x) - 64\,y(x) = 0 \tag{1}$$

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

$$SolucionGral := y(x) = \_C1\,e^{4x} + \_C2\,e^{-2x}\sin\left(2\sqrt{3}\,x\right) + \_C3\,e^{-2x}\cos\left(2\sqrt{3}\,x\right) \tag{2}$$

```
> EcuacionCaracteristica := m··3 − 64 = 0
```

$$EcuacionCaracteristica := m^3 - 64 = 0 \tag{3}$$

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

$$Raiz := 4,\ -2 + 2\,I\sqrt{3},\ -2 - 2\,I\sqrt{3} \tag{4}$$

```
> Solucion₁ := y(x) = exp(Raiz₁·x); Solucion₂ := y(x) = exp(Re(Raiz₂)·x)·cos(Im(Raiz₂)
     ·x); Solucion₃ := y(x) = exp(Re(Raiz₂)·x)·sin(Im(Raiz₂)·x)
```

$$Solucion_1 := y(x) = e^{4x}$$

$$Solucion_2 := y(x) = e^{-2x}\cos\left(2\sqrt{3}\,x\right)$$

$$Solucion_3 := y(x) = e^{-2x}\sin\left(2\sqrt{3}\,x\right) \tag{5}$$

```
> SolucionGeneral := y(x) = C1·rhs(Solucion₁) + C2·rhs(Solucion₂) + C3·rhs(Solucion₃)
```

$$SolucionGeneral := y(x) = C1\,e^{4x} + C2\,e^{-2x}\cos\left(2\sqrt{3}\,x\right) + C3\,e^{-2x}\sin\left(2\sqrt{3}\,x\right) \tag{6}$$

```
> SolucionGral;
```

$$y(x) = \_C1\,e^{4x} + \_C2\,e^{-2x}\sin\left(2\sqrt{3}\,x\right) + \_C3\,e^{-2x}\cos\left(2\sqrt{3}\,x\right) \tag{7}$$

```
> EcuacionDiferente := y''' − 64 y = 0
```

$$EcuacionDiferente := \frac{d^3}{dx^3} y(x) - 64\,y(x) = 0 \tag{8}$$
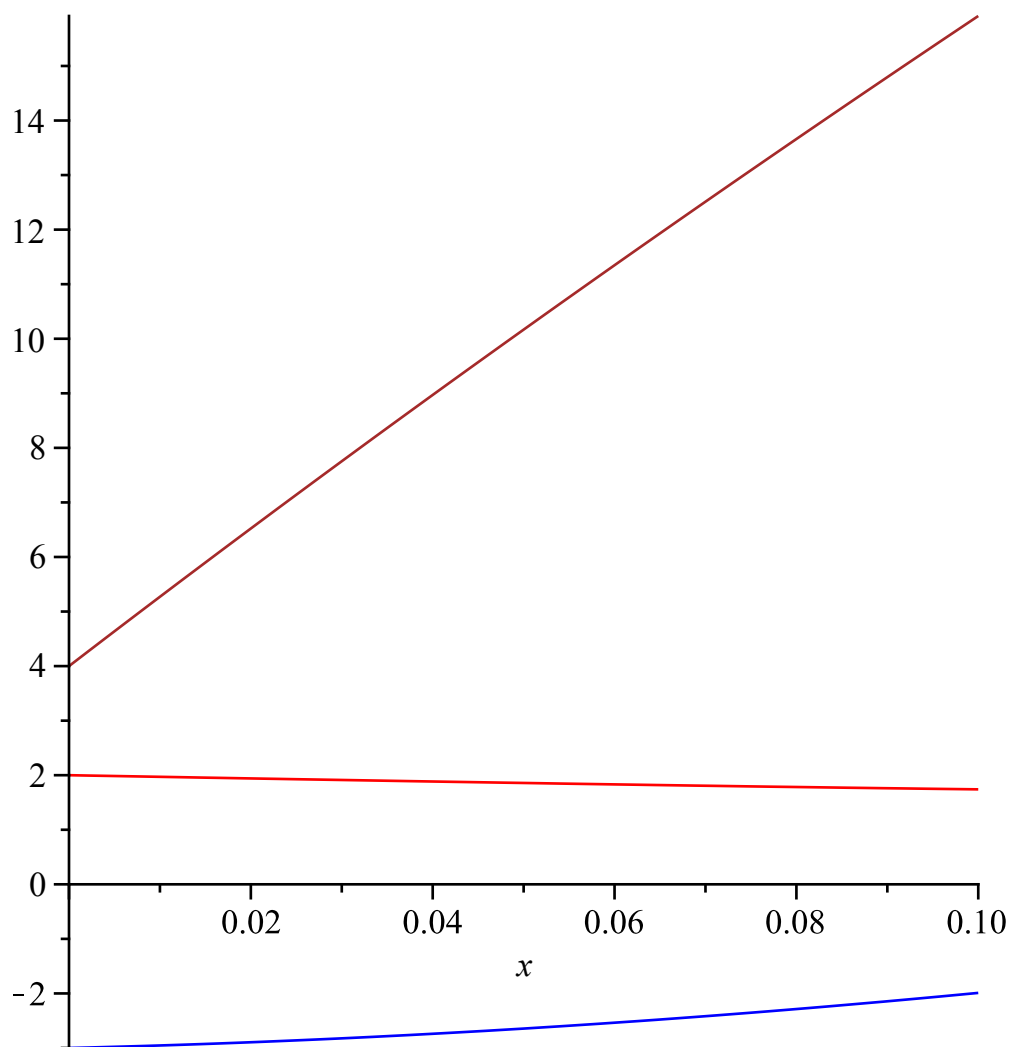
```
> Condiciones := y(0) = 2, D(y)(0) = −3, D(D(y))(0) = 4;
```

$$Condiciones := y(0) = 2,\ D(y)(0) = -3,\ D^{(2)}(y)(0) = 4 \tag{9}$$

```
> SolucionParticular := dsolve({EcuacionDiferente, Condiciones})
```

$$SolucionParticular := y(x) = \frac{1}{2}\,e^{4x} - \frac{1}{3}\,\sqrt{3}\,e^{-2x}\sin\left(2\sqrt{3}\,x\right) + \frac{3}{2}\,e^{-2x}\cos\left(2\sqrt{3}\,x\right) \tag{10}$$

```
> plot([rhs(SolucionParticular), rhs(diff(SolucionParticular, x)),
     rhs(diff(SolucionParticular, x$2))], x = 0..0.1, color = [red, blue, brown])
```

> *Condiciones*;

$$y(0) = 2, \mathrm{D}(y)(0) = -3, \mathrm{D}^{(2)}(y)(0) = 4$$

>

>