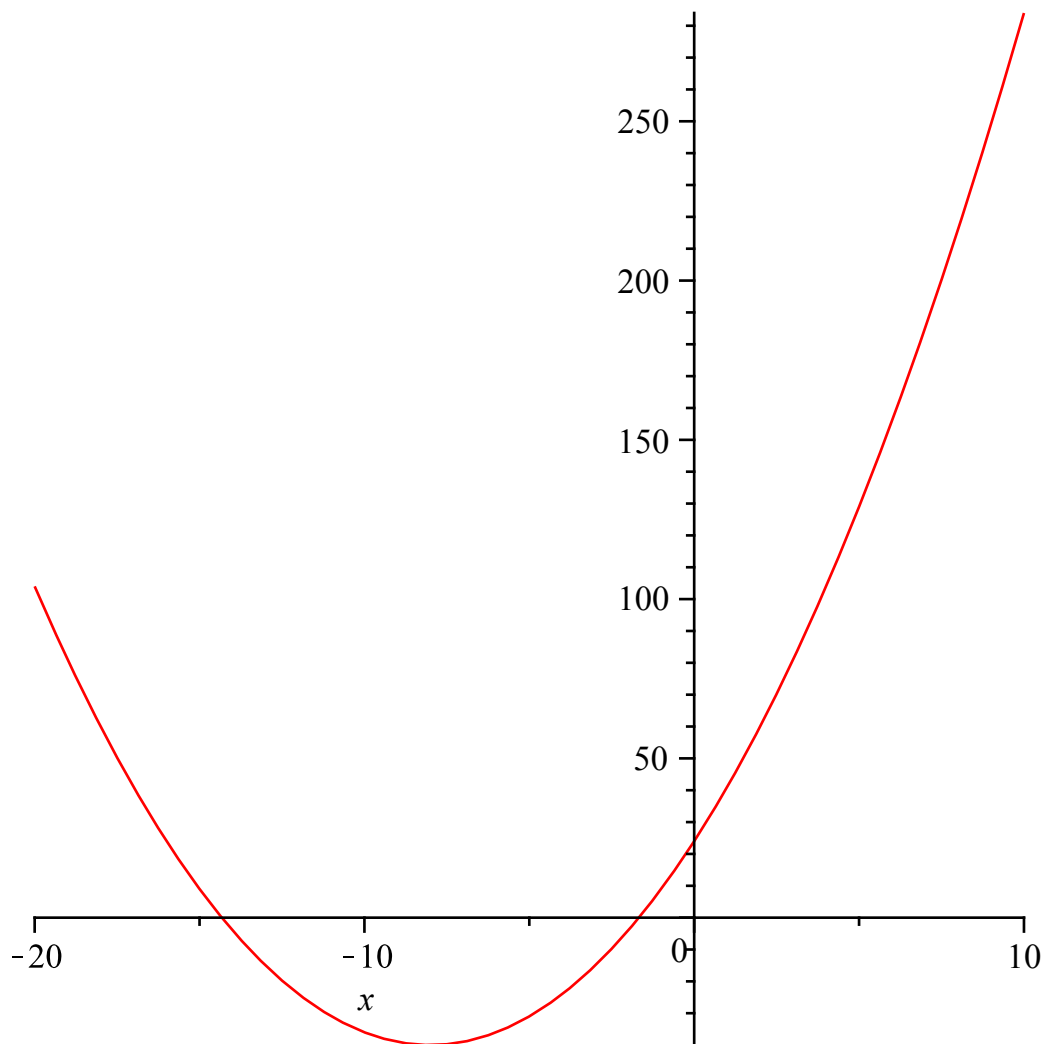


```

> restart
> Rac := 1/7 : evalf(Rac)
0.1428571429 (1)
> Rac
1/7 (2)
> Raiz := sqrt(2) : evalf(Raiz, 100)
1.4142135623730950488016887242096980785696718753769480731766797379907324784621\ (3)
07038850387534327641573
> Pitagoras := Pi; evalf(Pitagoras, 10000) : evalf(pi); evalf(PI); evalf(Pi)
Pitagoras := π
π
Π
3.141592654 (4)
> cos(Pi/4); evalf(%)
1/2 √2
0.7071067810 (5)
> Ecuacion := x^2 + 16x + 24 = 0;
Ecuacion := x^2 + 16x + 24 = 0 (6)
> Raices := solve(Ecuacion); evalf(%)
Raices := -8 + 2√10, -8 - 2√10
-1.675444680, -14.32455532 (7)
> Raices_1;
-8 + 2√10 (8)
> Raices_2;
-8 - 2√10 (9)
> EcuacionOriginal := expand((x - Raices_1) * (x - Raices_2)) = 0
EcuacionOriginal := x^2 + 16x + 24 = 0 (10)
> rhs(Ecuacion)
0 (11)
> plot(lhs(Ecuacion), x = -20 .. 10)

```



---

> *EcuacionDiferencial* := diff(y(t), t\$2) + 5·diff(y(t), t) + 6·y(t) = 8·cos(4·t)

$$\text{EcuacionDiferencial} := \frac{d^2}{dt^2} y(t) + 5 \left( \frac{d}{dt} y(t) \right) + 6 y(t) = 8 \cos(4 t) \quad (12)$$


---

> *SolucionGeneral* := dsolve(*EcuacionDiferencial*)

$$\text{SolucionGeneral} := y(t) = e^{-2t} \_C2 + e^{-3t} \_C1 - \frac{4}{25} \cos(4 t) + \frac{8}{25} \sin(4 t) \quad (13)$$


---

> *CondicionesIniciales* := y(0) = 3, D(y)(0) = -10;

$$\text{CondicionesIniciales} := y(0) = 3, D(y)(0) = -10 \quad (14)$$


---

> *SolucionParticular* := dsolve({*EcuacionDiferencial*, *CondicionesIniciales*})

$$\text{SolucionParticular} := y(t) = -\frac{9}{5} e^{-2t} + \frac{124}{25} e^{-3t} - \frac{4}{25} \cos(4 t) + \frac{8}{25} \sin(4 t) \quad (15)$$


---

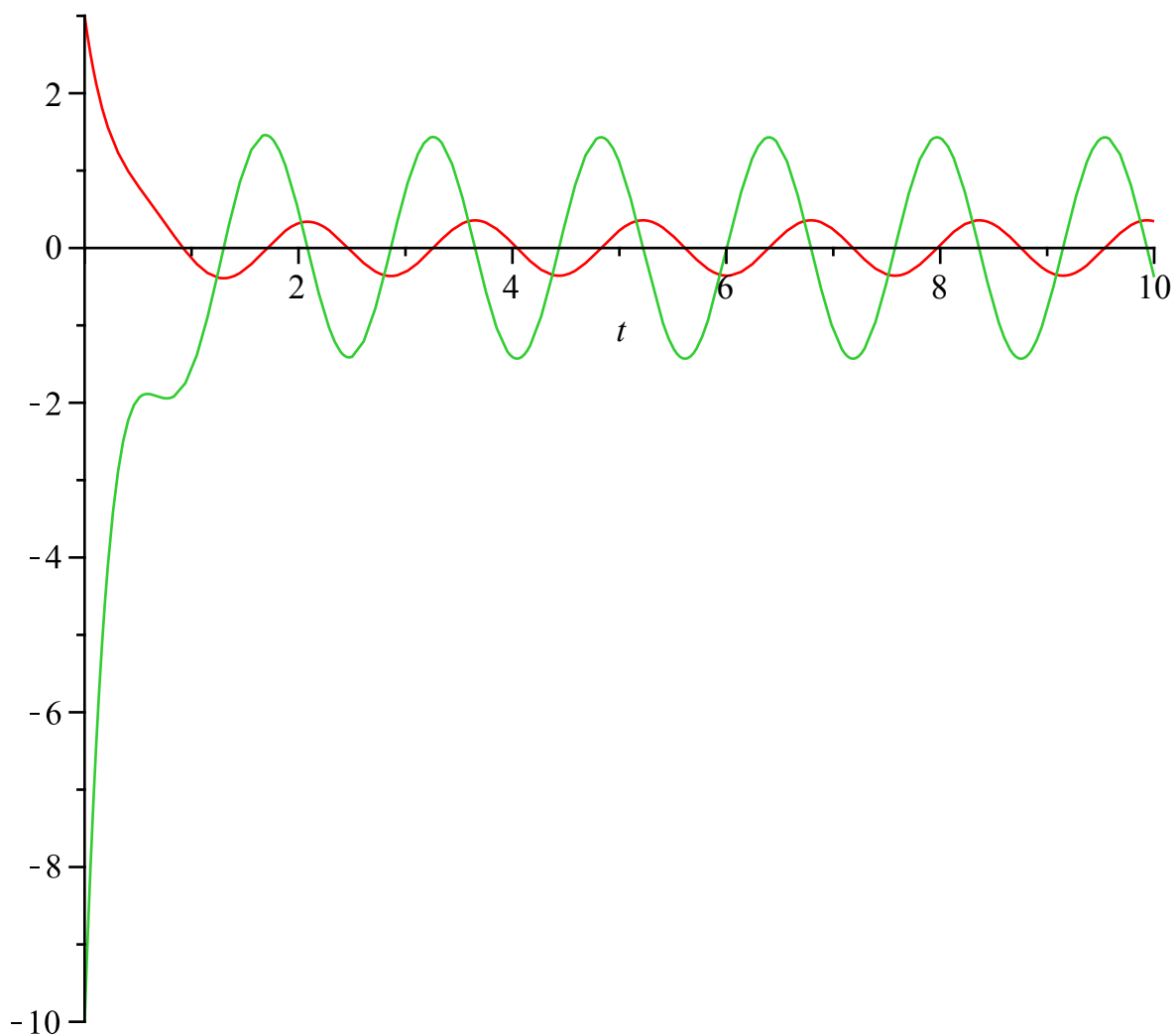
> *DerivadaSolucion* := diff(*SolucionParticular*, t)

$$\text{DerivadaSolucion} := \frac{d}{dt} y(t) = \frac{18}{5} e^{-2t} - \frac{372}{25} e^{-3t} + \frac{16}{25} \sin(4 t) + \frac{32}{25} \cos(4 t) \quad (16)$$


---

**Con esta instrucción podemos graficar amablemente la solución particular**

> plot([rhs(*SolucionParticular*), rhs(*DerivadaSolucion*)], t = 0..10)



```
> restart
```

```
> funcion := x::3·exp(-4·x)·sin(5·x);
```

$$funcion := x^3 e^{-4x} \sin(5x)$$

(17)

```
> Derivada := Diff(funcion, x) = diff(funcion, x)
```

$$Derivada := \frac{d}{dx} (x^3 e^{-4x} \sin(5x)) = 3x^2 e^{-4x} \sin(5x) - 4x^3 e^{-4x} \sin(5x) + 5x^3 e^{-4x} \cos(5x)$$

(18)

```
> IntegralIndefinida := Int(funcion, x) = int(funcion, x) + C_1
```

$$IntegralIndefinida := \int x^3 e^{-4x} \sin(5x) dx = \left( -\frac{5}{41} x^3 - \frac{120}{1681} x^2 - \frac{690}{68921} x + \frac{4320}{2825761} \right) e^{-4x} \cos(5x) + \left( -\frac{4}{41} x^3 + \frac{27}{1681} x^2 + \frac{1416}{68921} x + \frac{9114}{2825761} \right) e^{-4x} \sin(5x) + C_1$$

(19)

```
> IntegralDefinida := Int(funcion, x=2..5) = int(funcion, x=2..5); evalf(%)
```

$$IntegralDefinida := \int_2^5 x^3 e^{-4x} \sin(5x) dx = \frac{3615980}{2825761} e^{-8} \cos(10) + \frac{1898698}{2825761} e^{-8} \sin(10)$$

$$-\frac{48255755}{2825761} e^{-20} \cos(25) - \frac{33026431}{2825761} e^{-20} \sin(25)$$

$$-0.0004828487978 = -0.0004828487976$$

**(20)**

