Solución HT1

Ejercicio 1:

1)

In[1]:= `Integrate[ √Tan[x] , x]`

Out[1]= $\frac{2}{3}$ Hypergeometric2F1$[\frac{3}{4}, 1, \frac{7}{4}, -\text{Tan}[x]^2]$ Tan$[x]^{3/2}$

2)

In[2]:= `Integrate[`$\frac{\text{Log}[x+1]}{x^2+1}$`, {x, 0, 1}]`

Out[2]= $\frac{1}{8}$ π Log[2]

3)

In[3]:= `Integrate[`$\frac{y}{(x^2+y^2)^{\frac{3}{2}}}$`, {y, -a, a}]`

Out[3]= 0

Ejercicio 2:

1)

In[16]:= `DSolve[{m * x '[t] == -m * g - b * x[t]}, x[t], t]`

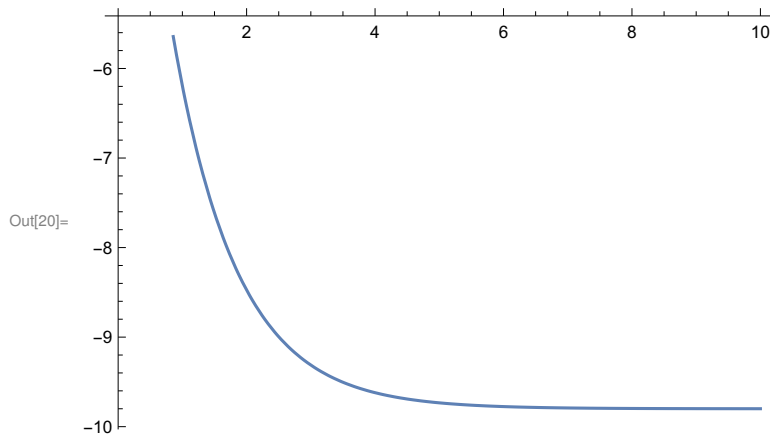Out[16]= $\{\{x[t] \rightarrow -9.8 + e^{-1. t} c_1\}\}$

In[17]:= `m = 1`
`b = 1`
`g = 9.8`

Out[17]= 1

Out[18]= 1

Out[19]= 9.8

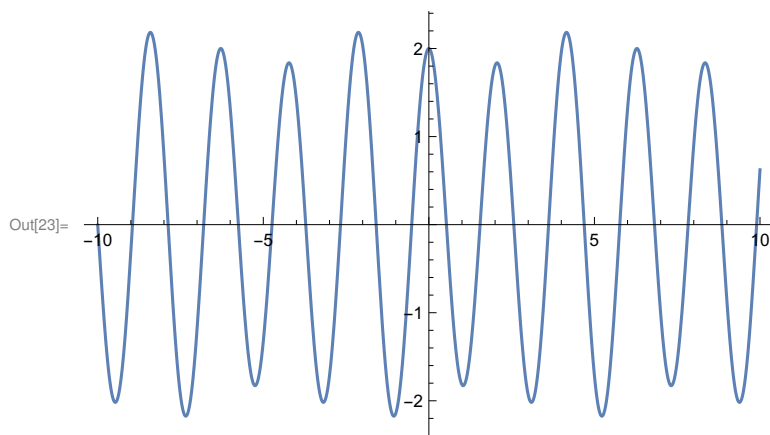In[20]:= `Plot[-9.8 + 9.8 * e^{-1*t} , {t, 0, 10}]`

Out[20]=

2)

In[21]:= `DSolve[{x''[t] + 9 * x[t] == Sin[2 * t], x[0] == 2, x'[0] == 0}, x[t], t]`

Out[21]= $\left\{\left\{x[t] \rightarrow \frac{1}{30} (60 \, Cos[3\,t] - 5 \, Cos[3\,t] \, Sin[t] - \right.\right.$

$\left.\left. 4 \, Sin[3\,t] + 5 \, Cos[t] \, Sin[3\,t] - Cos[5\,t] \, Sin[3\,t] + Cos[3\,t] \, Sin[5\,t])\right\}\right\}$

In[23]:= `Plot[` $\frac{1}{30}$ `* (60 * Cos[3 * t] - 5 * Cos[3 * t] * Sin[t] - 4 * Sin[3 * t] +`

`5 * Cos[t] * Sin[3 * t] - Cos[5 * t] * Sin[3 * t] + Cos[3 * t] * Sin[5 * t]), {t, -10, 10}]`

Out[23]=

3)

In[30]:= `{{solx, soly}} =`

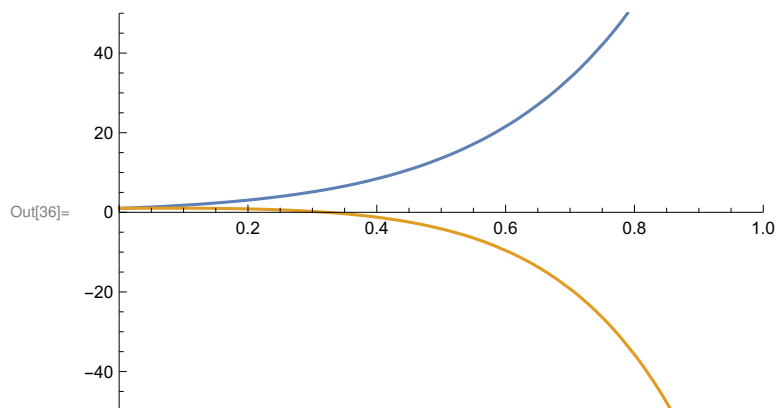`DSolve[{x'[t] == 5 * x[t] + y[t], y'[t] == -2 * x[t] + 3 * y[t], x[0] == 1, y[0] == 1}, {x[t], y[t]}, t]`

Out[30]= $\left\{\left\{x[t] \rightarrow e^{4\,t} (Cos[t] + 2 \, Sin[t]), \, y[t] \rightarrow e^{4\,t} (Cos[t] - 3 \, Sin[t])\right\}\right\}$

In[31]:= `x3[t_] := x[t] /. solx`

`y3[t_] := y[t] /. soly`

In[36]:= `Plot[{x3[t], y3[t]}, {t, 0, 10}, PlotRange → {{0, 1}, {-50, 50}}]`

Out[36]=

4)

In[38]:= `{{solx4, soly4}} =`
  `DSolve[{x '[t] == -x[t] + 3 * y[t], y '[t] == -3 * x[t] + 5 * y[t], x[0] == 2, y[0] == 3}, {x[t], y[t]}, t]`

Out[38]= $\{\{x[t] \to e^{2t} (2 + 3 t), \, y[t] \to 3 e^{2t} (1 + t)\}\}$

In[39]:= `x4[t_] := x[t] /. solx4`
  `y4[t_] := y[t] /. soly4`

In[43]:= `Plot[{x4[t], y4[t]}, {t, 0, 10}, PlotRange → {{0, 1}, {0, 100}}]`

Out[43]=