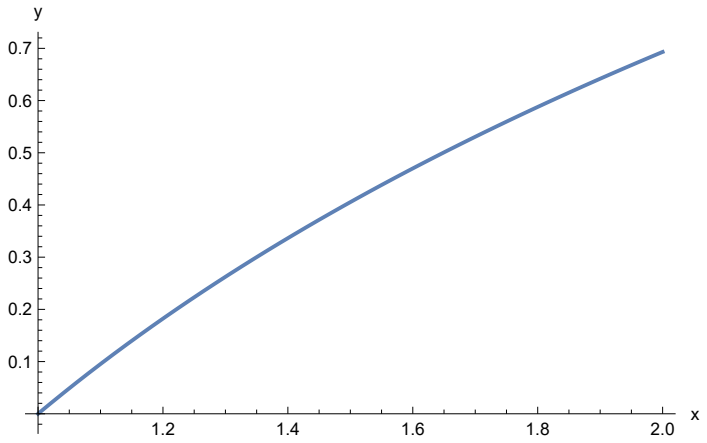
```
Clear["Global`*"]
sol1 = NDSolve[{y''[x] == -Exp[-2 * y[x]], y[1] == 0, y[2] == Log[2]}, y, {x, 1, 2}]
Plot[Evaluate[y[x] /. sol1], {x, 1, 2}, PlotRange → All, AxesLabel → {"x", "y"}]

sol2 = NDSolve[
  {y''[x] == y'[x] Cos[x] - y[x] Log[y[x]], y[0] == 1, y[π / 2] == E}, y, {x, 0, π / 2}]
Plot[Evaluate[y[x] /. sol2], {x, 0, π / 2}, PlotRange → All, AxesLabel → {"x", "y"}]

sol3 = NDSolve[{y''[x] == -(2 (y'[x])^3 + y[x]^2 × y'[x]) Sec[x],
    y[π / 4] == 2^(-1 / 4), y[π / 3] == 12^(1 / 2) / 2}, y, {x, π / 4, π / 3}]
Plot[Evaluate[y[x] /. sol3], {x, π / 4, π / 3}, PlotRange → All, AxesLabel → {"x", "y"}]

sol4 = NDSolve[
  {y''[x] == 1 / 2 - (y'[x])^2 / 2 - y[x] Sin[x] / 2, y[0] == 2, y[π] == 2}, y, {x, 0, π}]
Plot[Evaluate[y[x] /. sol4], {x, 0, π}, PlotRange → All, AxesLabel → {"x", "y"}]
```

Out[47]=

```
{{y → InterpolatingFunction[ Domain: {{1., 2.}}
                             Output: scalar ]}}
```

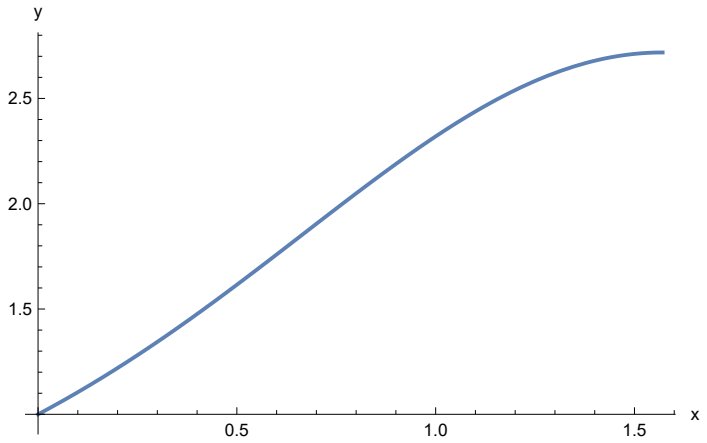
Out[48]=



Out[49]=

```
{{y → InterpolatingFunction[ Domain: {{0., 1.57}}
                             Output: scalar ]}}
```

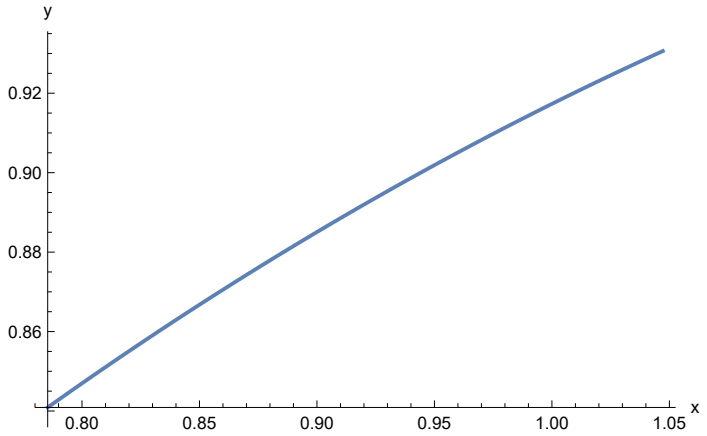
Out[50]=



Out[51]=

$$\{\{y \to \text{InterpolatingFunction}[\ \text{Domain: } \{\{0.785,\ 1.05\}\}\ \text{Output: scalar}\ ]\}\}$$

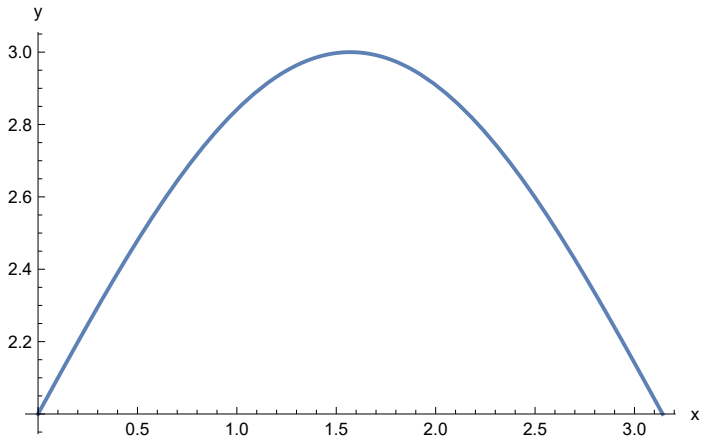
Out[52]=



Out[53]=

$$\{\{y \to \text{InterpolatingFunction}[\ \text{Domain: } \{\{0.,\ 3.14\}\}\ \text{Output: scalar}\ ]\}\}$$

Out[54]=



In[71]:=

```
(*Clear["Global`*"]
  sol1=DSolve[{y''[x]==-Exp[-2*y[x]],y[1]==0,y[2]==Log[2]},y,{x,1,2}]
Plot[Evaluate[y[x]/. sol1],{x,1,2},PlotRange→All,AxesLabel→{"x","y"}]*)

(*Clear["Global`*"]
  sol2=DSolve[{y''[x]==y'[x] Cos[x]-y[x] Log[y[x]],y[0]==1,y[π/2]==E},y,{x,0,π/2}]
Plot[Evaluate[y[x]/. sol2],{x,0,π/2},PlotRange→All,AxesLabel→{"x","y"}]*)

(*sol3=DSolve[{y''[x]==-(2 (y'[x])^3+y[x]^2 y'[x]) Sec[x],
    y[π/4]==2^(-1/4),y[π/3]==12^(1/4)/2},y,{x,π/4,π/3}]
Plot[Evaluate[y[x]/. sol3],{x,π/4,π/3},PlotRange→All,AxesLabel→{"x","y"}]*)

(*sol4=DSolve[{y''[x]==1/2-(y'[x])^2/2-y[x] Sin[x]/2,y[0]==2,y[π]==2},y,{x,0,π}]
Plot[Evaluate[y[x]/. sol4],{x,0,π},PlotRange→All,AxesLabel→{"x","y"}]*)
```