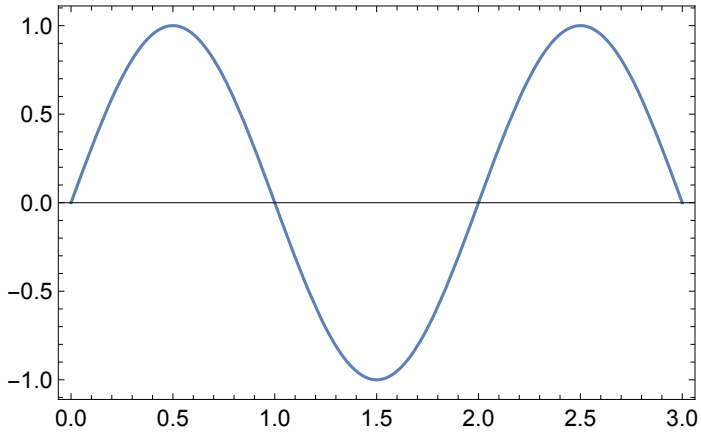
One-dimensional plots

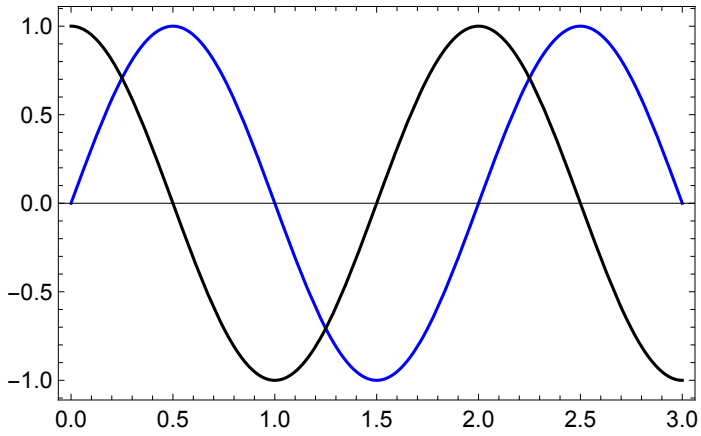
In[•]:=
```
Plot[Sin[Pi x], {x, 0, 3}]
```

Out[•]=



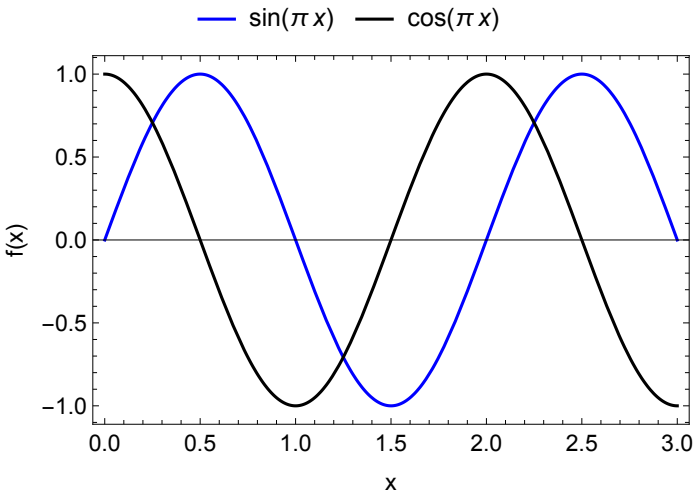
In[•]:=
```
Plot[{Sin[Pi x], Cos[Pi x]}, {x, 0, 3}, PlotStyle → {Blue, Black}]
```

Out[•]=



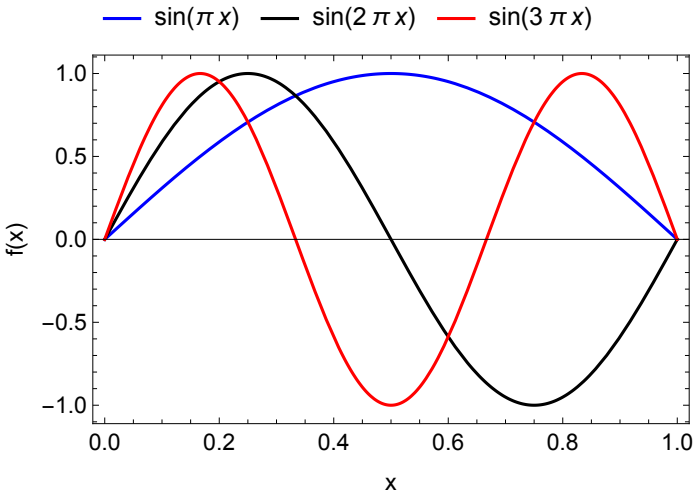
In[]:=
```
Plot[{Sin[Pi x], Cos[Pi x]}, {x, 0, 3}, PlotStyle → {Blue, Black},
 FrameLabel → {"x", "f(x)"},
 PlotLegends → Placed["Expressions", Top]]
```

Out[]=



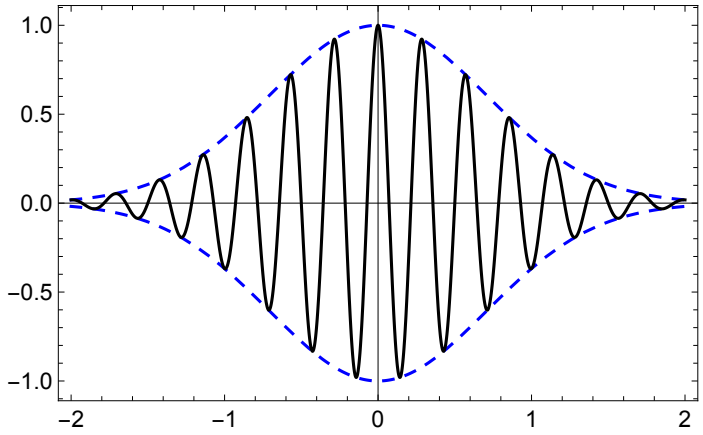
In[]:=
```
Plot[Evaluate@Table[Sin[n Pi x], {n, 1, 3}],
 {x, 0, 1}, PlotStyle → {Blue, Black, Red},
 FrameLabel → {"x", "f(x)"},
 PlotLegends → Placed["Expressions", Top]]
```

Out[]=



```
In[•]:= Plot[{Exp[-x^2], -Exp[-x^2], Exp[-x^2] Cos[7 Pi x]}, {x, -2, 2},
 PlotStyle → {{Dashing[Medium], Blue}, {Dashing[Medium], Blue}, Black}]
```

Out[•]=



Plotting the solution of a damped harmonic oscillator

Suppose the equation of motion is $y'' + 2y' + 100y = 0$, and the initial conditions are $y(0) = 0$, $y'(0) = 2$.

• Use DSolve to solve the initial value problem

```
In[•]:= yOsc[t_] =
 y[t] /. DSolve[{y''[t] + 2 y'[t] + 101 y[t] == 0, y[0] == 0, y'[0] == 2}, y[t], t][[1]]
```

Out[•]=

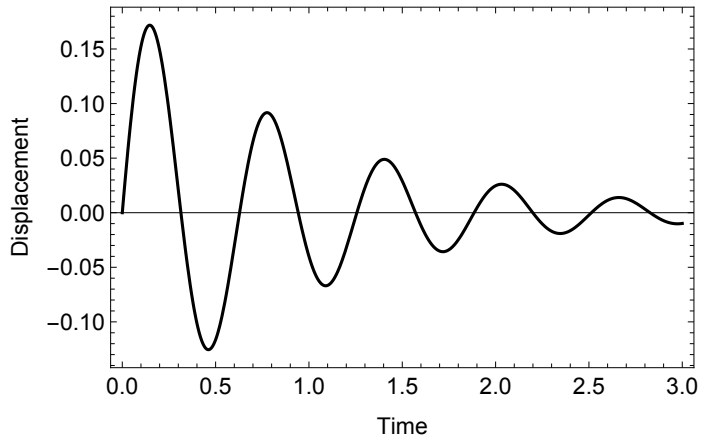
$$\frac{1}{5} e^{-t} \sin(10\, t)$$

As expected, we see damped oscillations

• Plot the solution against time

```
In[•]:= Plot[yOsc[t], {t, 0, 3}, PlotStyle → Black, FrameLabel → {"Time", "Displacement"}]
```

Out[•]=



• Plot the solution along with the damping envelope

We'll show the solution as a solid black line, and the exponential envelopes with dashed blue lines.

In[•]:=
```
Plot[{Exp[-t] / 5, -Exp[-t] / 5, yOsc[t]}, {t, 0, 3},
 PlotStyle → {{Dashing[Medium], Blue}, {Dashing[Medium], Blue}, Black},
 FrameLabel → {"Time", "Displacement"}]
```

Out[•]=