

■ Damped Harmonic Motion

```
Clear["Global`*"];  
Off[General::spell1];
```

■ Define the equation of motion and the initial conditions and then combine them

```
eq1 = m x''[t] - k x[t] - b x'[t];  
init = {x[0] == x0, x'[0] == v0};  
eq2 = Append[init, eq1];
```

■ Now solve for x[t] and simplify!?

```
dsol = DSolve[eq2, x[t], t] // Simplify
```

■ Define the constants to some useful values (try changing these)

```
val = {x0 == 0, v0 == 10, m == 1, k == 1, b == .2};
```

■ Make up a graph of a x as a function of t

```
curve = ParametricPlot[Evaluate[{t, x[t]} /. dsol /. val], {t, 0, 16 Pi},  
  GridLines -> Automatic, Frame -> True, PlotStyle -> {RGBColor[1, 0, 0]},  
  PlotRange -> {{0, 16 Pi}, {-10, 10}}, FrameLabel -> {"t", "x"}, RotateLabel -> False];
```

