

First, define the differential equation:

> **diffeq:=diff(y(t),t)=-k*(y(t)-yr);**

$$\text{diffeq} := \frac{\partial}{\partial t} y(t) = -k (y(t) - yr)$$

Then have Maple solve it:

> **sol:=dsolve({diffeq,y(0)=y0},y(t));**

$$\text{sol} := y(t) = yr + e^{(-kt)} (-yr + y0)$$

Check to make sure it really is the solution by plugging the solution into the differential equation:

> **subs(sol,diffeq);**

$$\frac{\partial}{\partial t} (yr + e^{(-kt)} (-yr + y0)) = -k e^{(-kt)} (-yr + y0)$$

Oops - Maple didn't differentiate. Tell it to do the derivative:

> **eval(%);**

$$-k e^{(-kt)} (-yr + y0) = -k e^{(-kt)} (-yr + y0)$$

Let's see what this function looks like with some numbers. We need to plot the right-hand-side of the equation, not the whole equation (how do you plot an equation??)

> **p:=subs(y0=50,yr=72,k=0.12,rhs(sol));**

$$p := 72 - 22 e^{(-.12 t)}$$

> **plot(p,t=0..100)**

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