"This is the differential equation describing the current:"

"emf +iR +L(di/dt) = 0"

"separate the variables:"

"di/(i+emf/R)=-(R/L)dt"

"integrate:"

$$\int_{i0}^{i} \frac{1}{i + \frac{emf}{R}}\, di = \int_{0}^{t} -\frac{R}{L}\, dt$$

"solve:"

$$LN(R\cdot i + emf) - LN(R\cdot i0 + emf) = -\frac{R\cdot t}{L}$$

"solve for i as a function of t:"

$$\left[i = \frac{\hat{e}^{-R\cdot t/L}\cdot(R\cdot i0 + emf)}{R} - \frac{emf}{R} \right]$$

"plug in some numbers:"

"R=0.09 L=0.0002 i0=2.7 emf=12"

$$\left[i = \frac{4081\cdot\hat{e}^{-450\cdot t}}{30} - \frac{400}{3} \right]$$

"use the above to plot a graph of i vs t"

"find the value of t for which i=0:"

$$\left[t = \frac{LN\left(\frac{4081}{4000}\right)}{450} \right]$$

$$[t = 4.45504340083\cdot 10^{-5}]$$