An electric circuit with an ohmic resistor $R$ and an inductance $L $will exhibit a certain delay in approaching the (asymptotic) saturation current $I\_{\infty }=U/R$ in response to a voltage source $U$. Using Kirchoff’s circuit laws, electrical engineers have proposed the equation
$$\frac{dI}{dt}=-\frac{R}{L}I+\frac{U}{L}$$

for describing the time dependence $I(t)$ of the electric current.

1. If the electric current is zero at time $t=0$, determine the solution $I(t)$ in terms of the given constants $U, R, $and $L$.
2. Electrical engineers are often interested in the time $T$ when the electric current $I$ reaches 75% of its saturation value. Determine the value of $T$ in terms of the given constants.
3. Assuming a circuit with $U=200V, R=50Ω, L=100H,$ when is the electric current $0.5A$ below the saturation level? You may ignore the units here (they are all SI).