Capacitor and Inductor Cheat Sheet

Capacitors:

$Q = VC$
$\frac{dQ}{dt} = C\frac{dV}{dt}$
$I = C\frac{dV}{dt}$
Capacitors in series: $\frac{1}{C_{eq}} = \frac{1}{C_1} + \cdots + \frac{1}{C_n}$
Capacitors in parallel: $C_{eq} = C_1 + \cdots + C_n$
Electric Field Energy stored in a capacitor: $E = \frac{1}{2}CV^2$
Voltage should never change instantaneously (because infinite current results)

In steady state, when connected to a DC circuit, they act as OPEN CIRCUITS.
Impedance: $Z_C = \frac{1}{j\omega C}$

Inductors:

We will never use the first two equations in this class, but they are here for your edification:
$\Phi = \frac{LI}{N}$
$\frac{\mathrm{d}\Phi}{\mathrm{dt}} = \frac{L}{N}\frac{dI}{dt}$
$V = L\frac{dI}{dt}$
Inductors in series : $L_{eq} = L_1 + \cdots + L_n$
Inductors in parallel: $\frac{1}{L_{eq}} = \frac{1}{L_1} + \cdots + \frac{1}{L_n}$
Magnetic Field Energy stored in an inductor: $E = \frac{1}{2}LI^2$
Current should never change instantaneously (because infinite voltage results)
In steady state, when connected to a DC circuit, they act as SHORT CIRCUITS.
Impedance: $Z_L = j\omega L$

(Note that $\frac{\mathrm{d}\Phi}{\mathrm{dt}} = \frac{V}{N}$ [Faraday's Law], which is how we end up with $V = L\frac{dI}{dt}$ from $\frac{\mathrm{d}\Phi}{\mathrm{dt}} = \frac{L}{N}\frac{dI}{dt}$)