Introduction:

I wanted my students to be high acheivers and be exceptional in their trade, so I always encouraged "Critical Thinking" in the tasks I set before them.

I believe there is a good chance that the material that I would present to you now is something that most of you have never studied, but is very important with all of it's applications. We are about to take Ohms Law to a whole new level. Although you may never actually work at this in the future, the concepts here may very well apply in other applications.

So, put your thinking cap on and let's dive right in.

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Illustration #1: Series Circuits, then Parallel Circuits, computations referenced to ground

Illustration #2: Series/Parallel Combination Circuit, with all computations and Potentials

Illustration #3: Series/Parallel Combination Circuit, with all computations and Potentials, referenced to ground, but with no ground shown, or moveable ground.

Illustration #4: The "Ladder Circuit", with all computations – no Potentials (yet)
* Consider the effect of a changing "Load" at the Load Point

Illustration #5: Now, we learn a new approach:

Converting to a "Thevinins Equivelant Circuit"

Illustration #5a: Remove the "Load" and compute what is called the "EOC"
{Voltage (E), across an Open Circuit (OC) at the Load Point}

Illustration #5b: Replace the Voltage Source with it's internal resistance and compute the circuit ***from the Load Point*** as a single composite value.

Illustration #5c: Create a simple series circuit consisting of the original source and a single resistance using the composite value just computed, and re-apply the "Load" to the Load Point, and simply re-compute currents and votages as needed.

Converting to a "Norton's Equivelant Circuit"

Illustration #5d: Create a different circuit with the original source, but with the composite value in parallel to the Load applied at the Load Point, and compute the ***current divisions*** with obviously a common voltage. ("ISC")
I.E. "Short Circuit Current", (or current at the short circuit).

Notice that the voltage and currents at the Load Points are the same for both illustrations.