

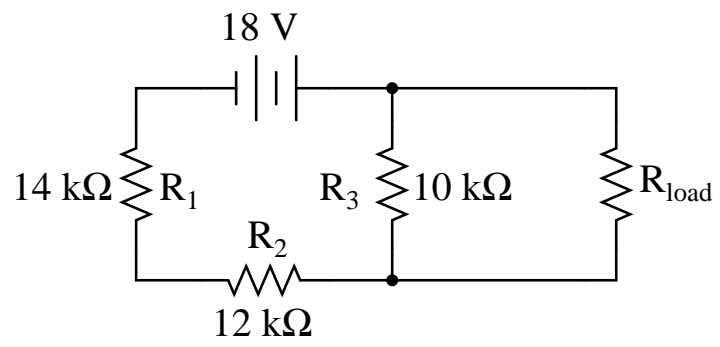
Questions

Question 1

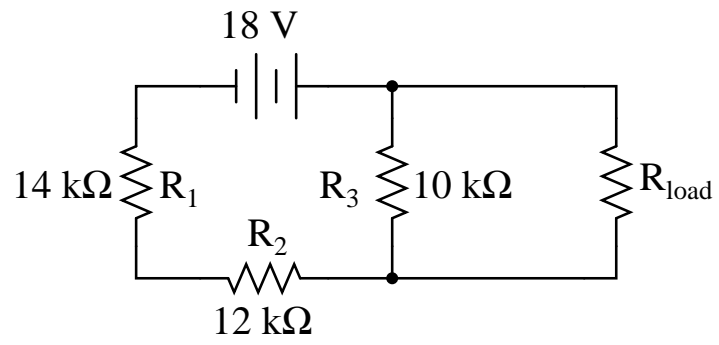
Animation: Applying Thévenin's theorem

This question consists of a series of images (one per page) that form an animation. Flip the pages with your fingers to view this animation (or click on the "next" button on your viewer) frame-by-frame.

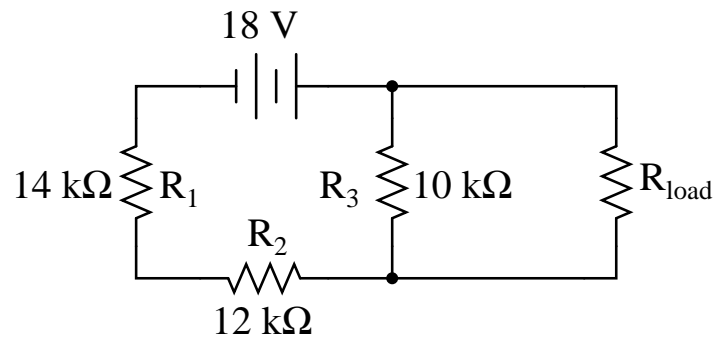
The following animation shows the steps involved in "Thévenizing" a circuit.



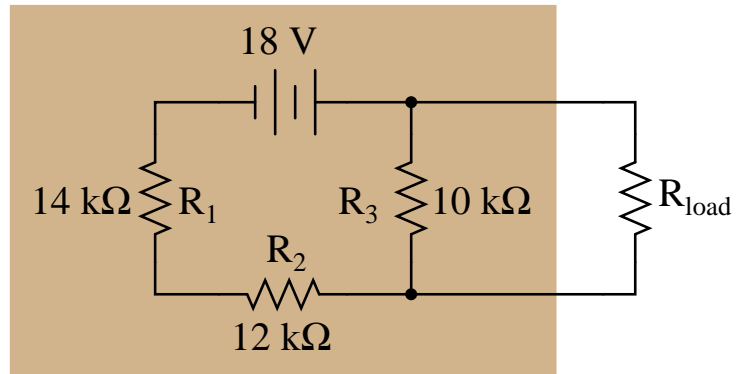
This is our original circuit:



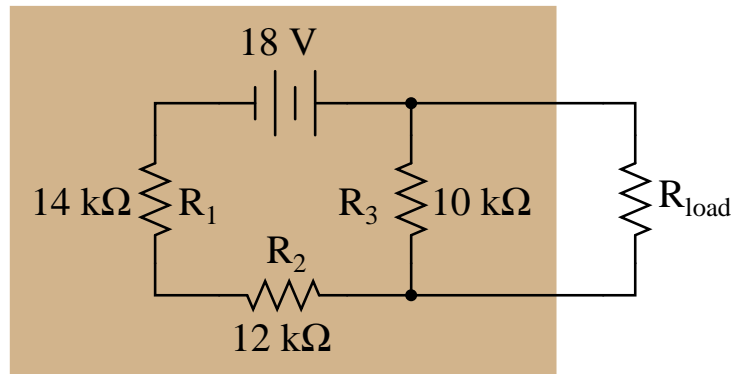
*We may use Thevenin's theorem
to simplify this portion of the circuit . . .*



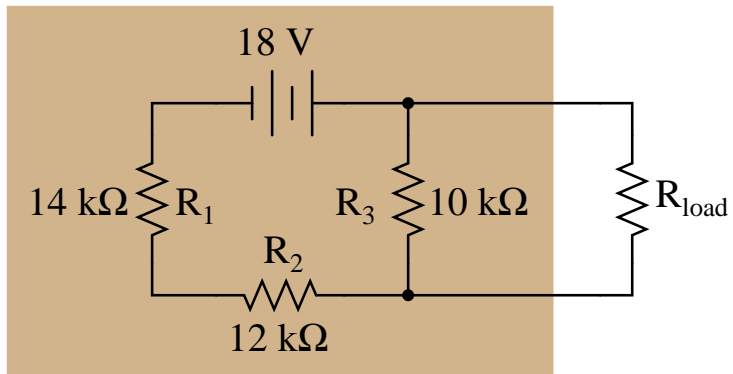
*We may use Thevenin's theorem
to simplify this portion of the circuit . . .*

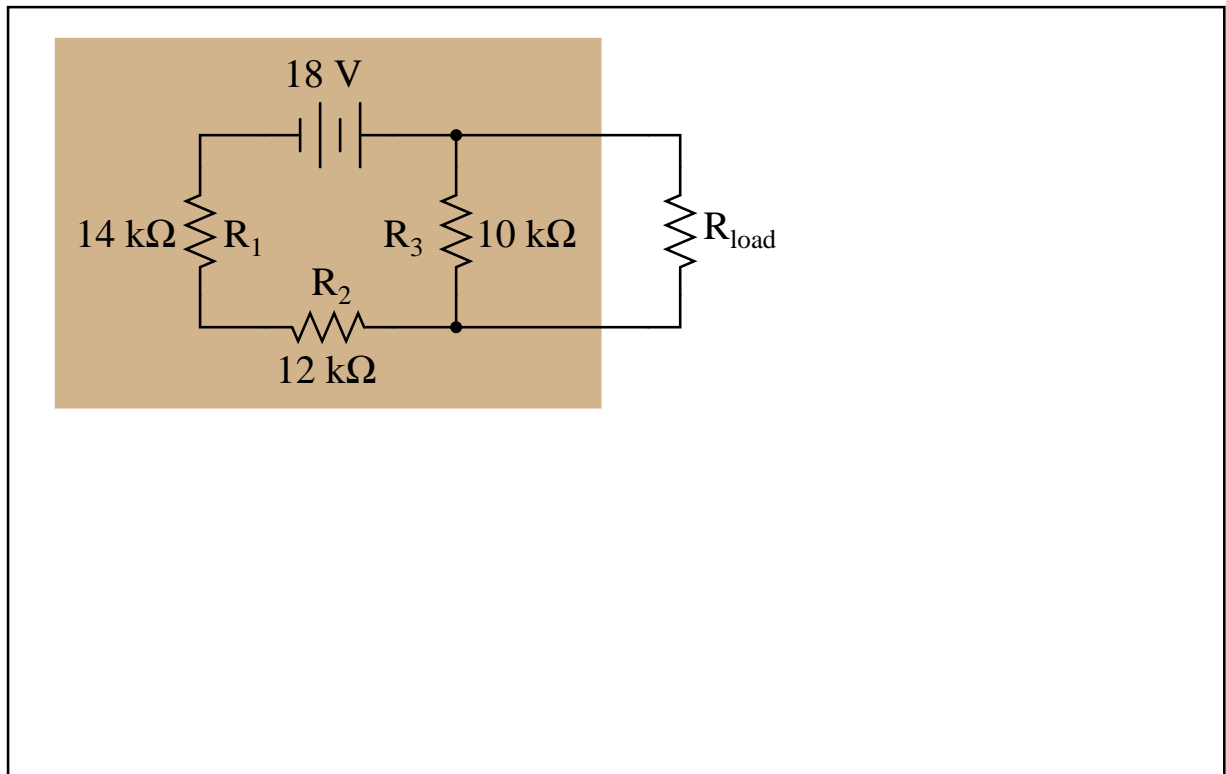


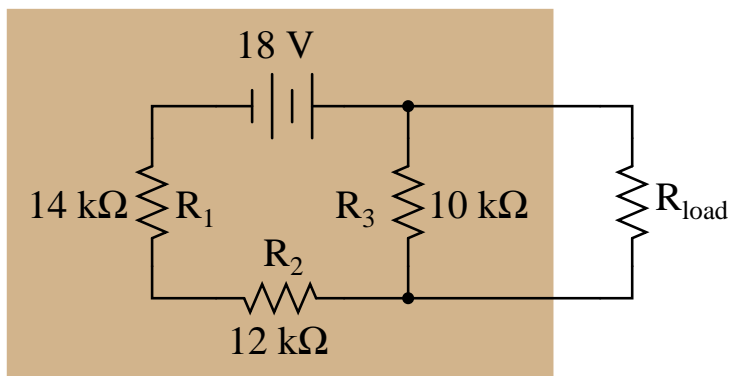
*We may use Thevenin's theorem
to simplify this portion of the circuit . . .*



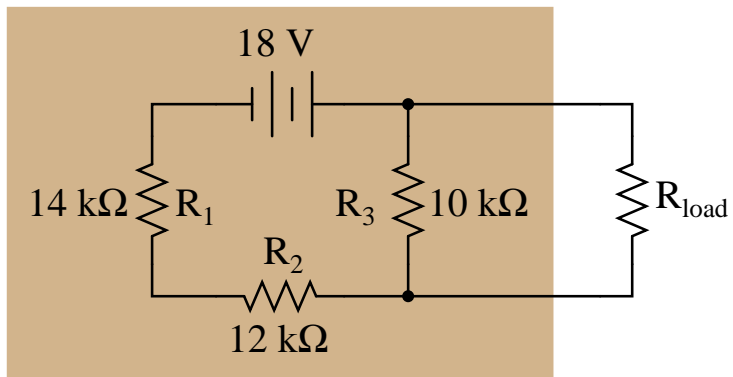
*We may use Thevenin's theorem
to simplify this portion of the circuit . . .*



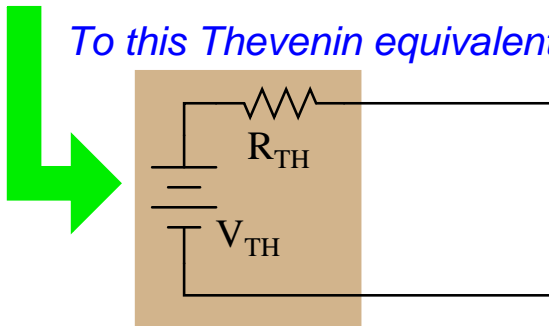


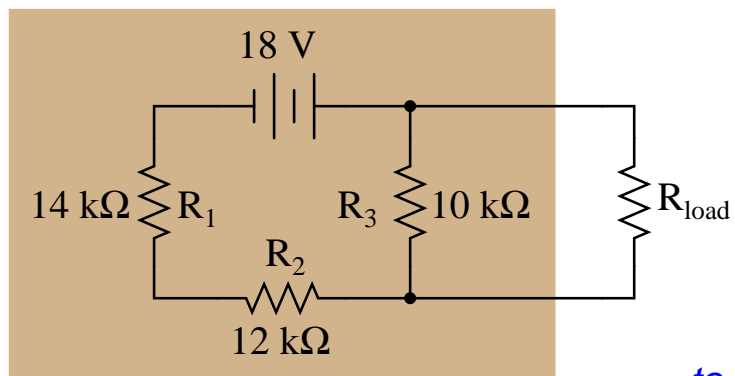


To this Thevenin equivalent circuit . . .

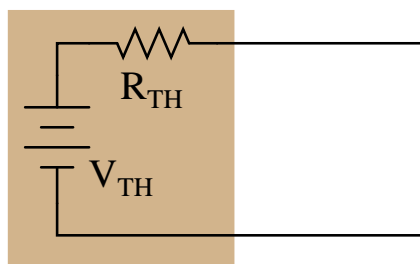


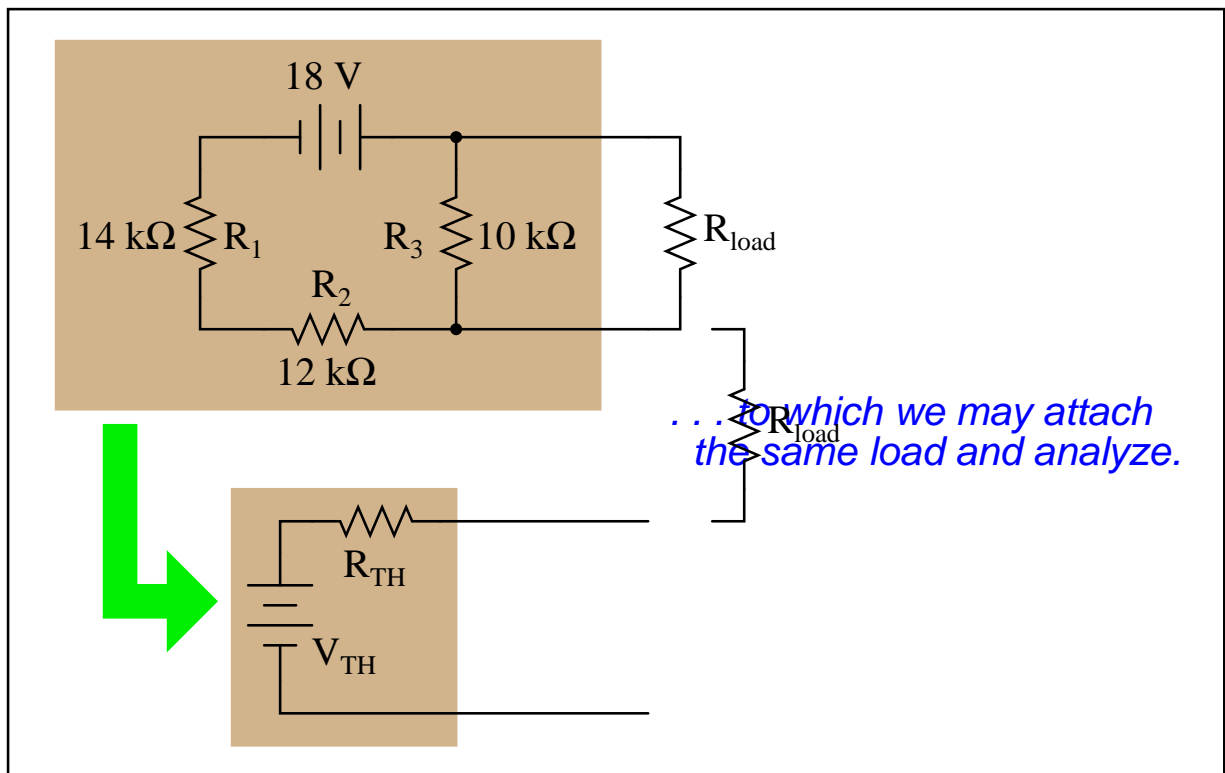
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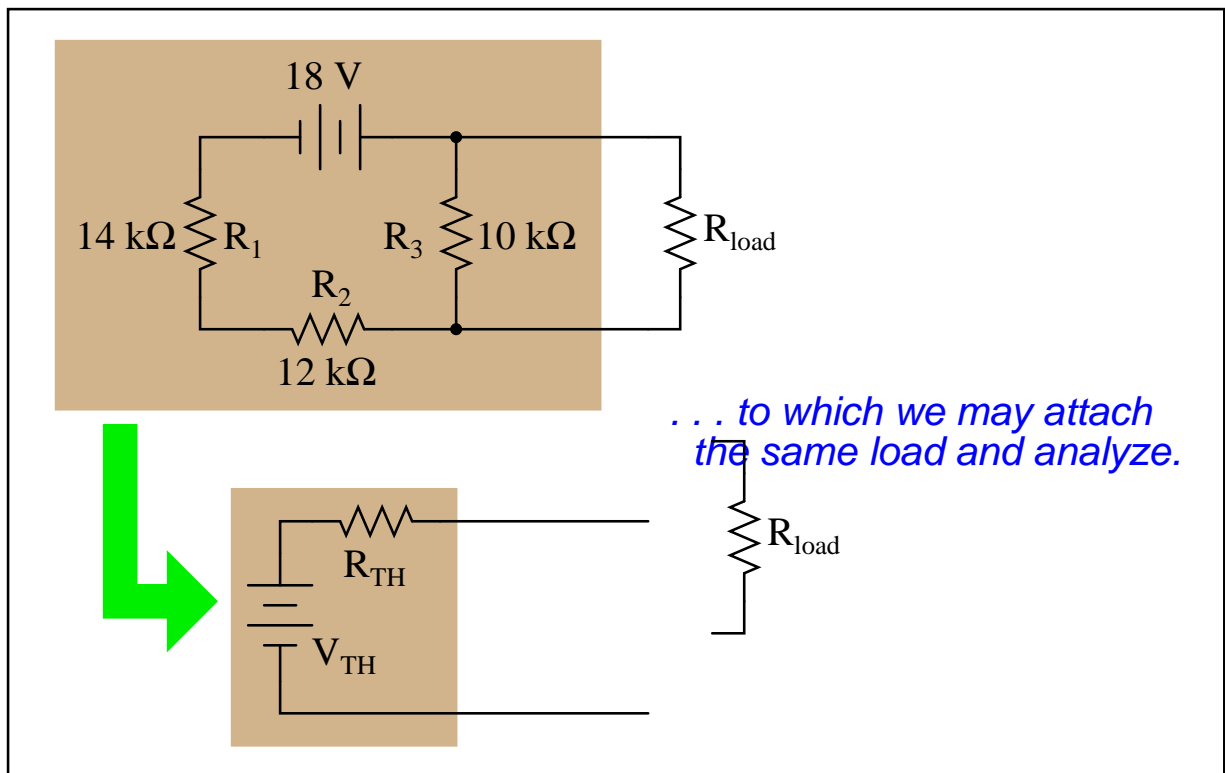


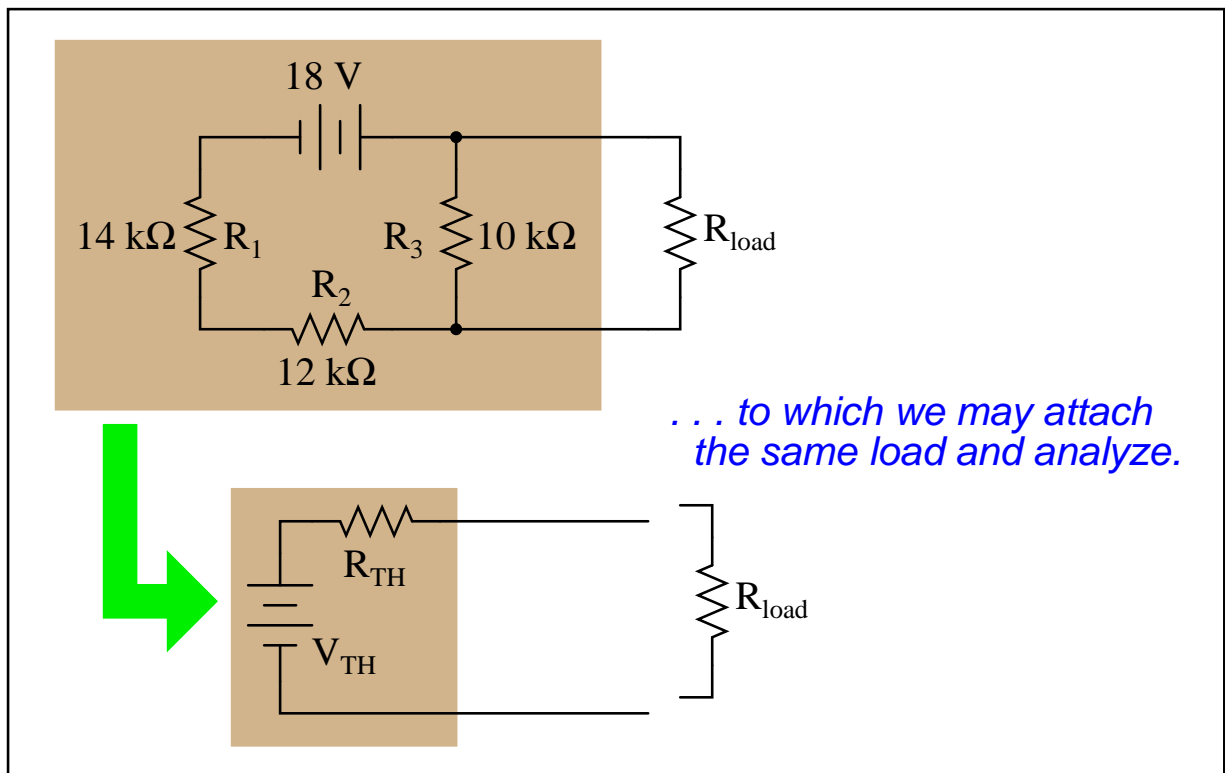


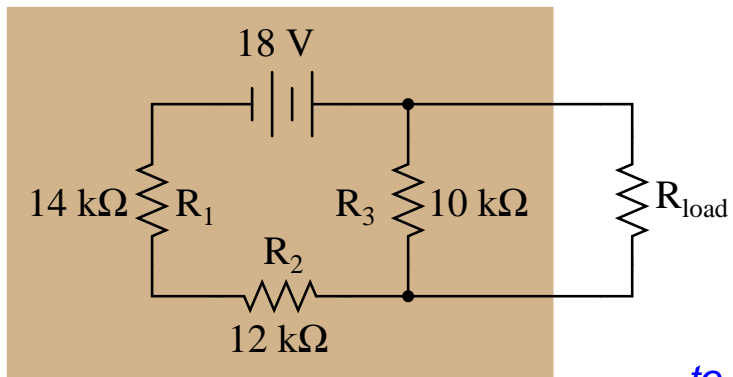
*... to which we may attach
the same load and analyze.*



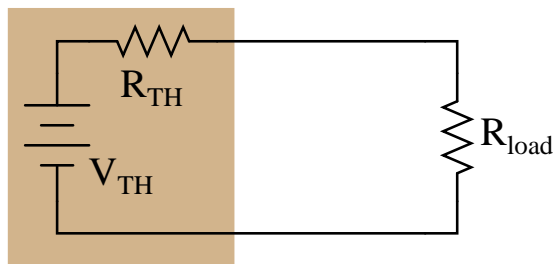


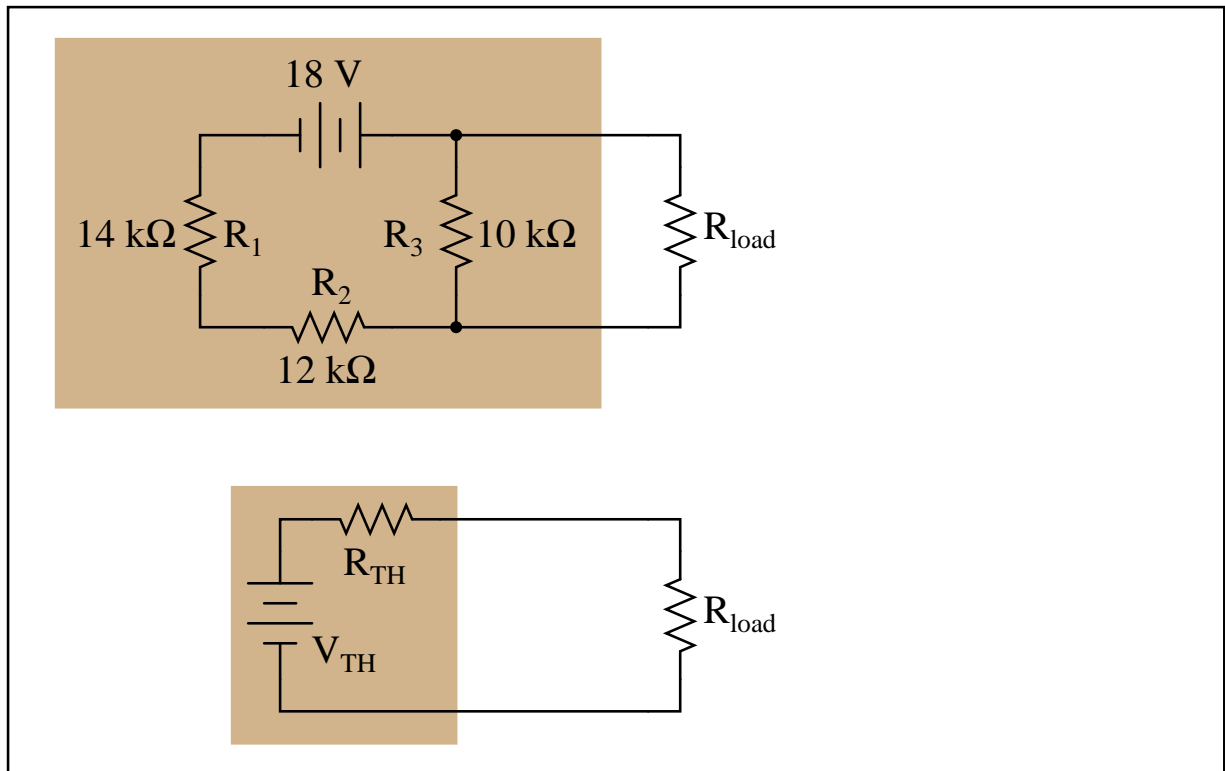


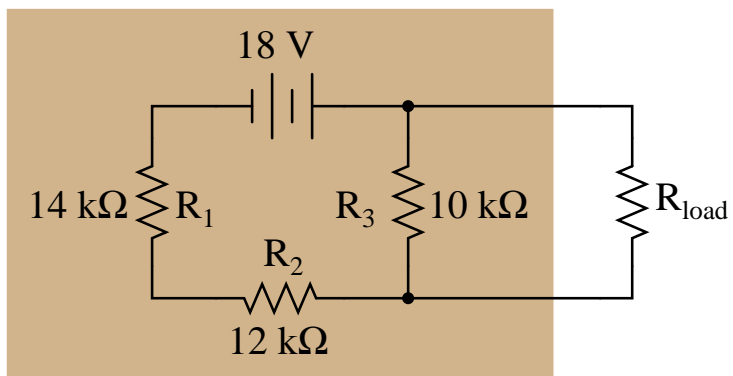




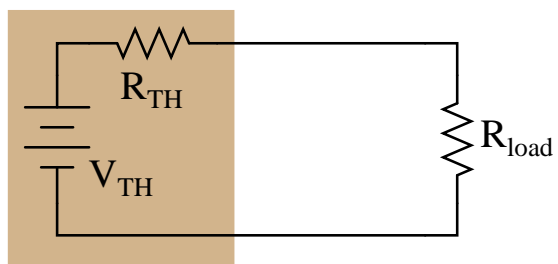
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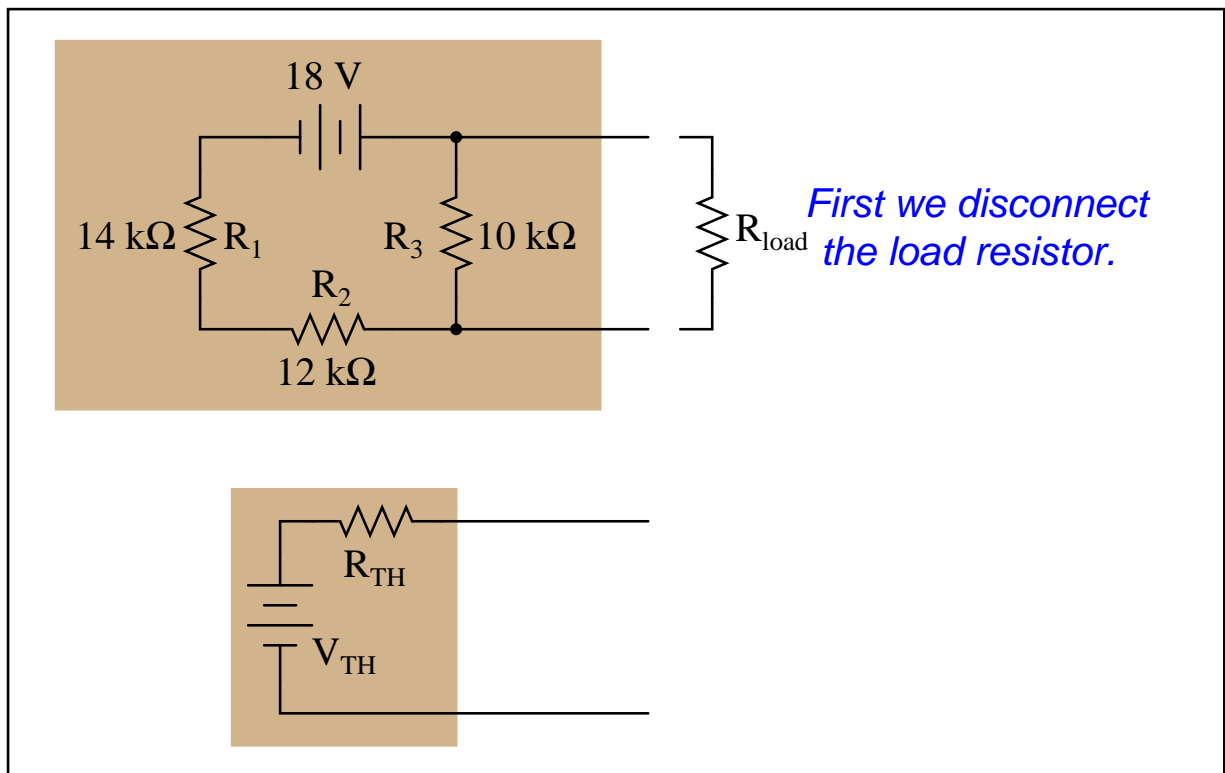


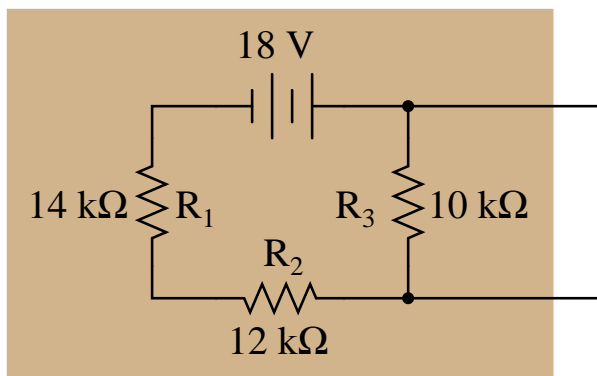




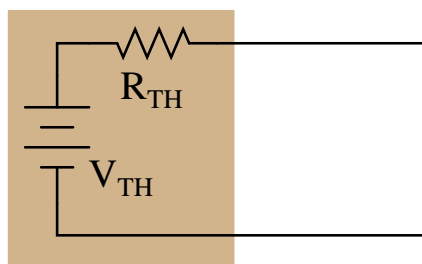
*First we disconnect
the load resistor.*

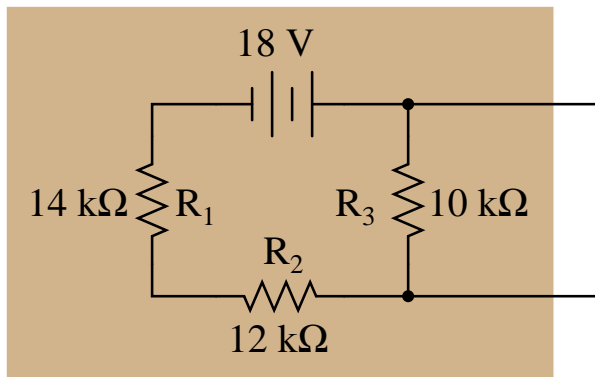




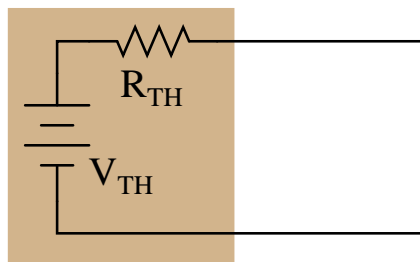
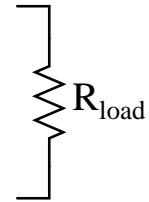


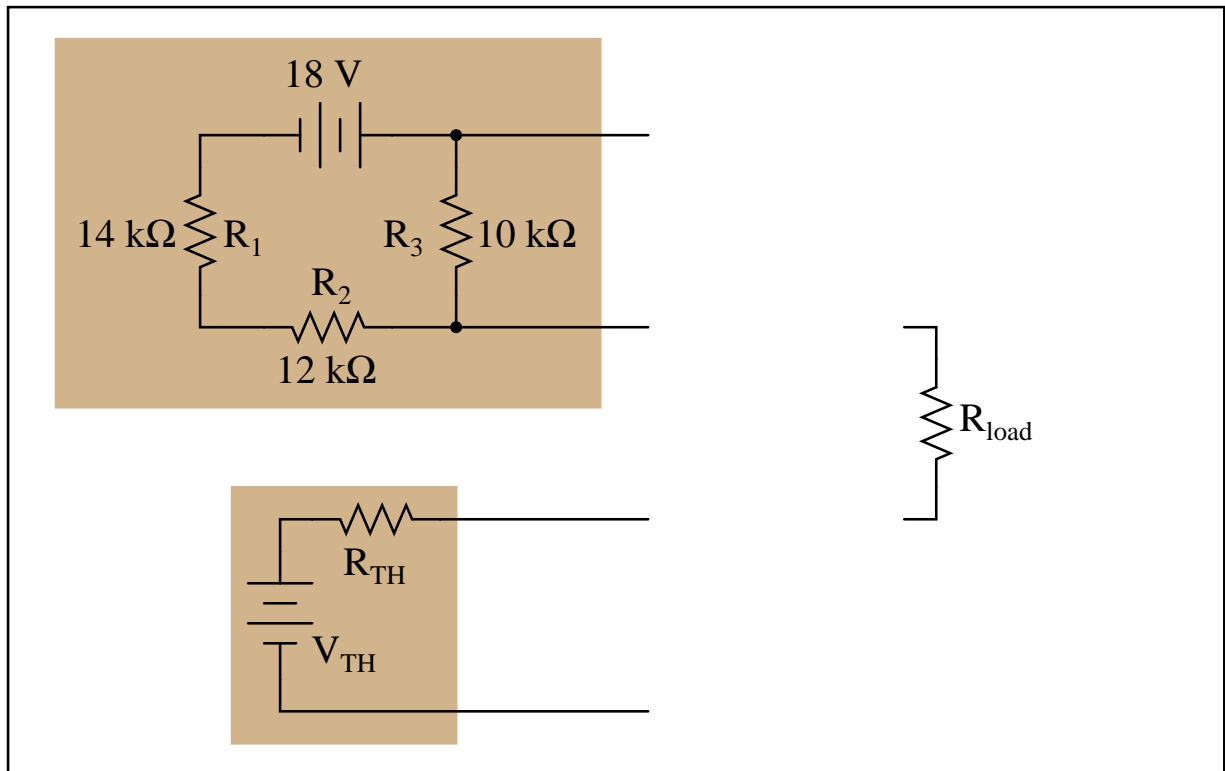
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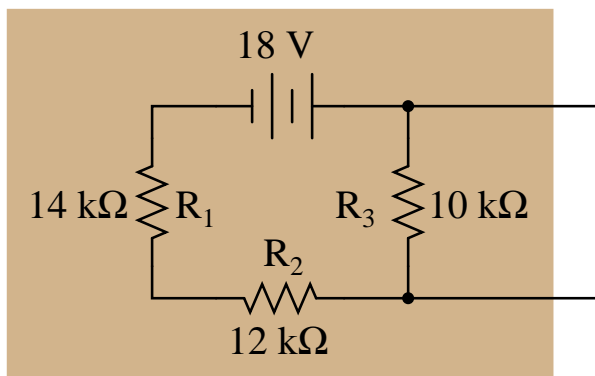




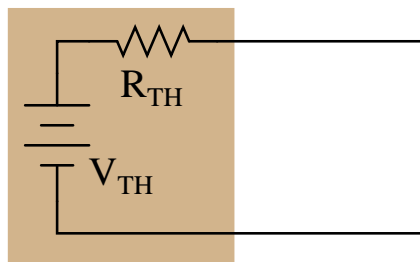
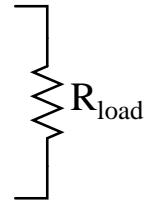
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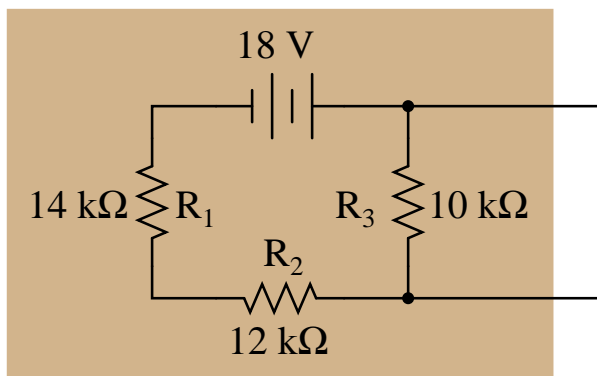







Then we calculate how much voltage appears across the open load terminals.

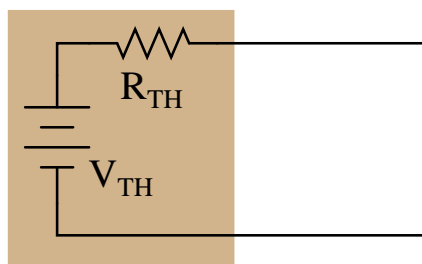
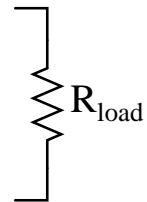


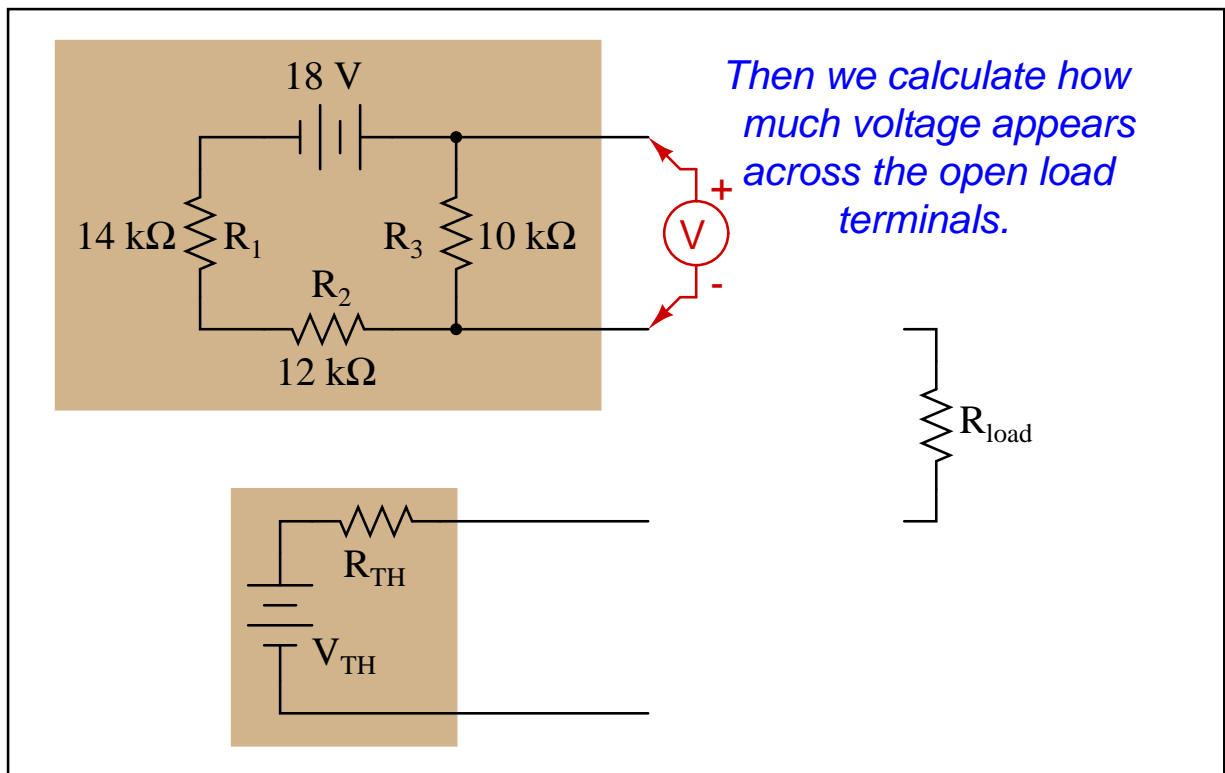


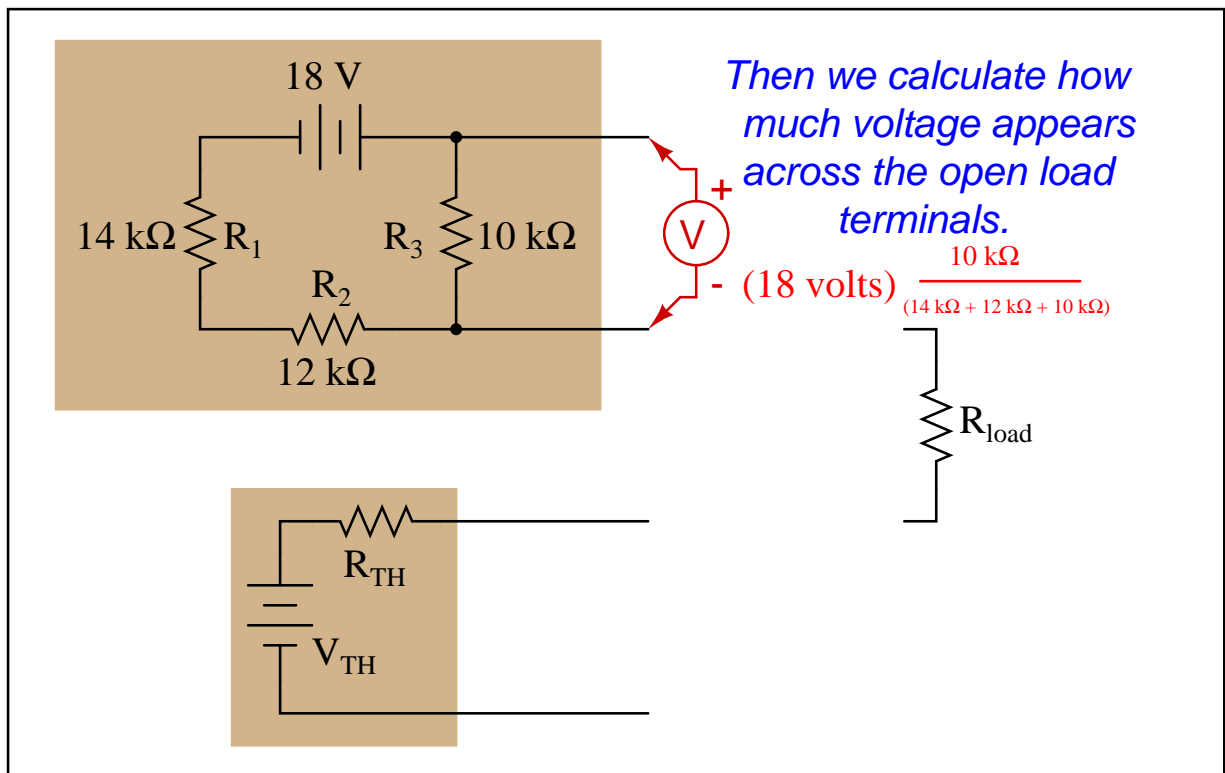
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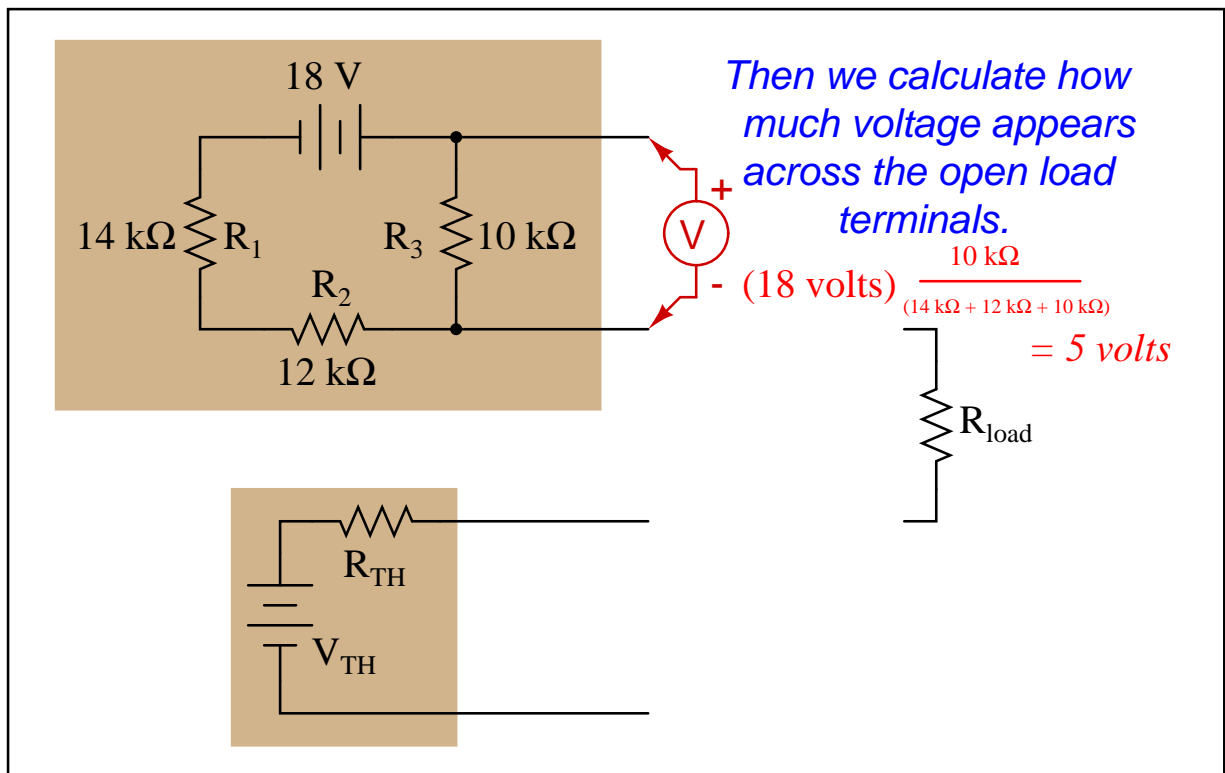


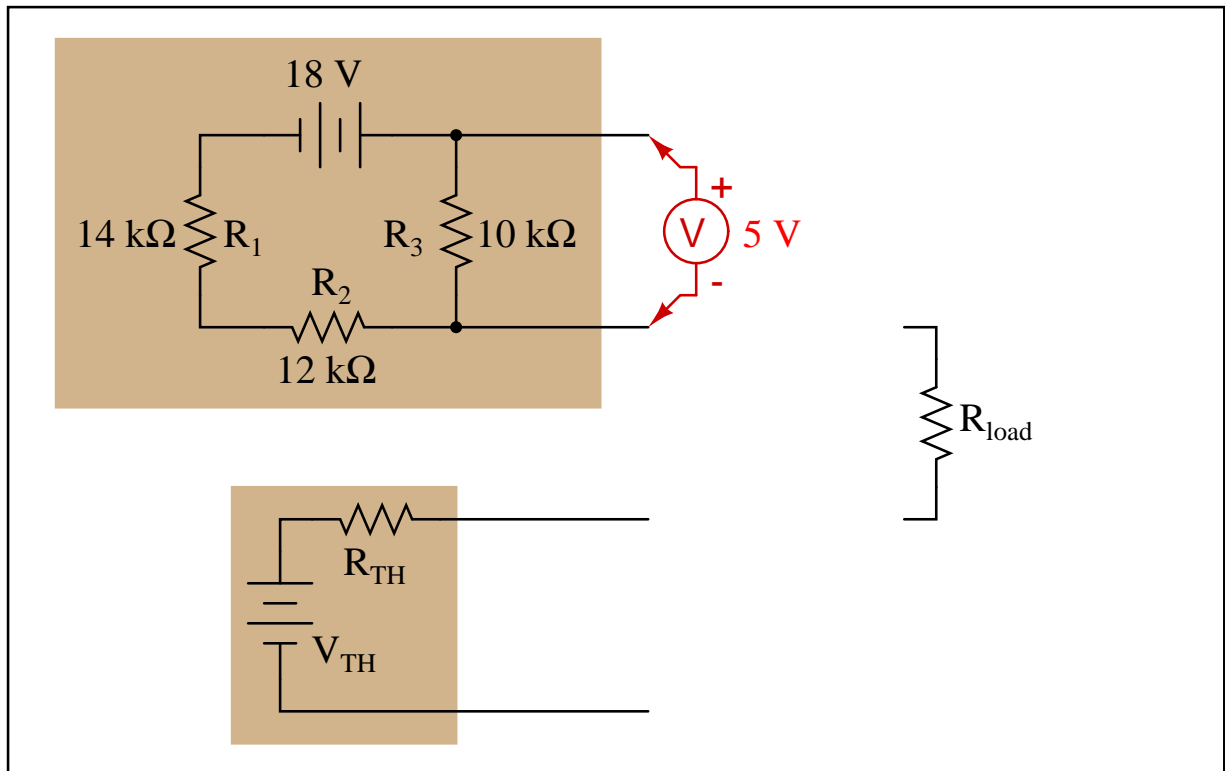
A red circle containing a 'V' with a '+' sign at the top and a '-' sign at the bottom, representing a voltmeter connected across the open terminals.

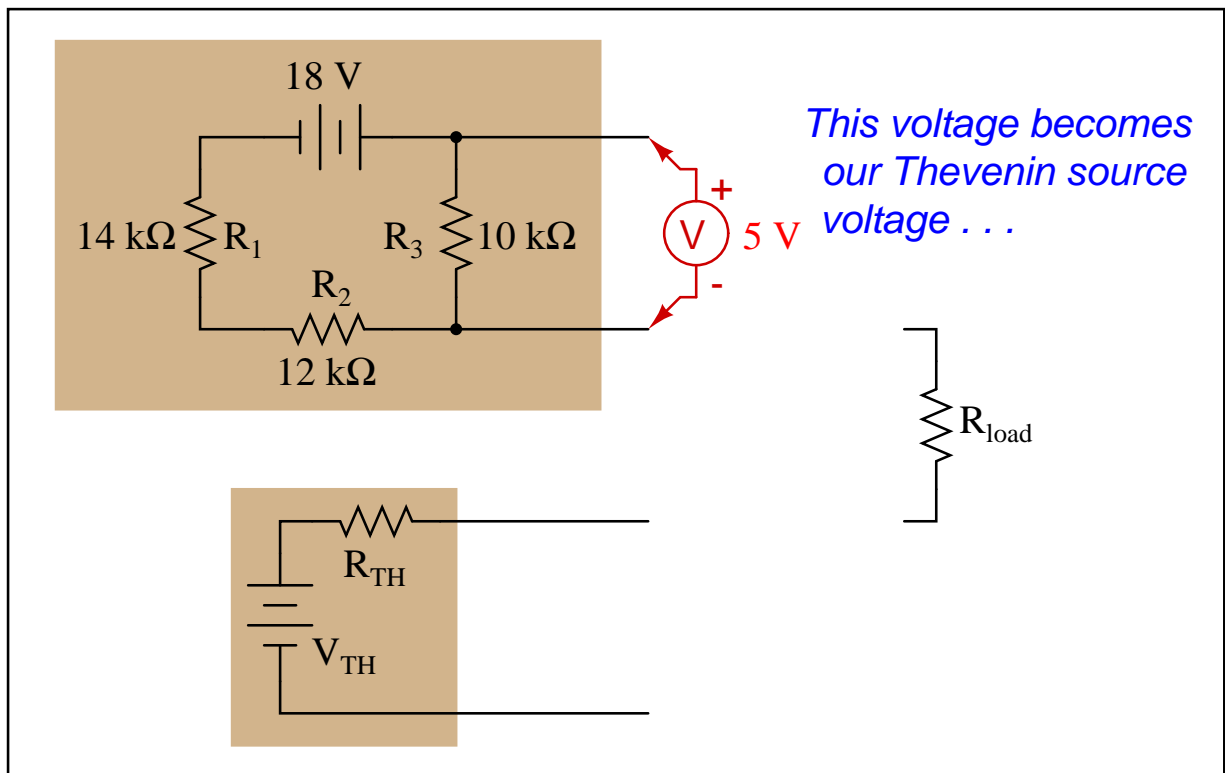


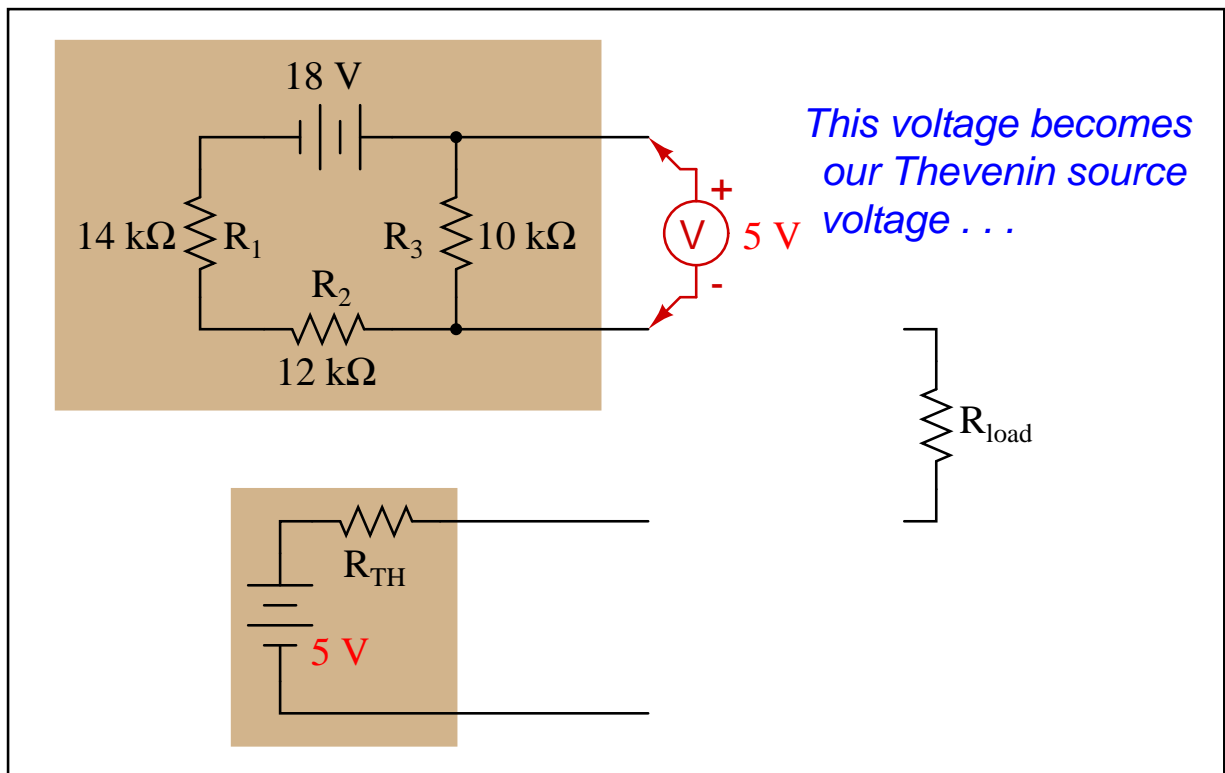


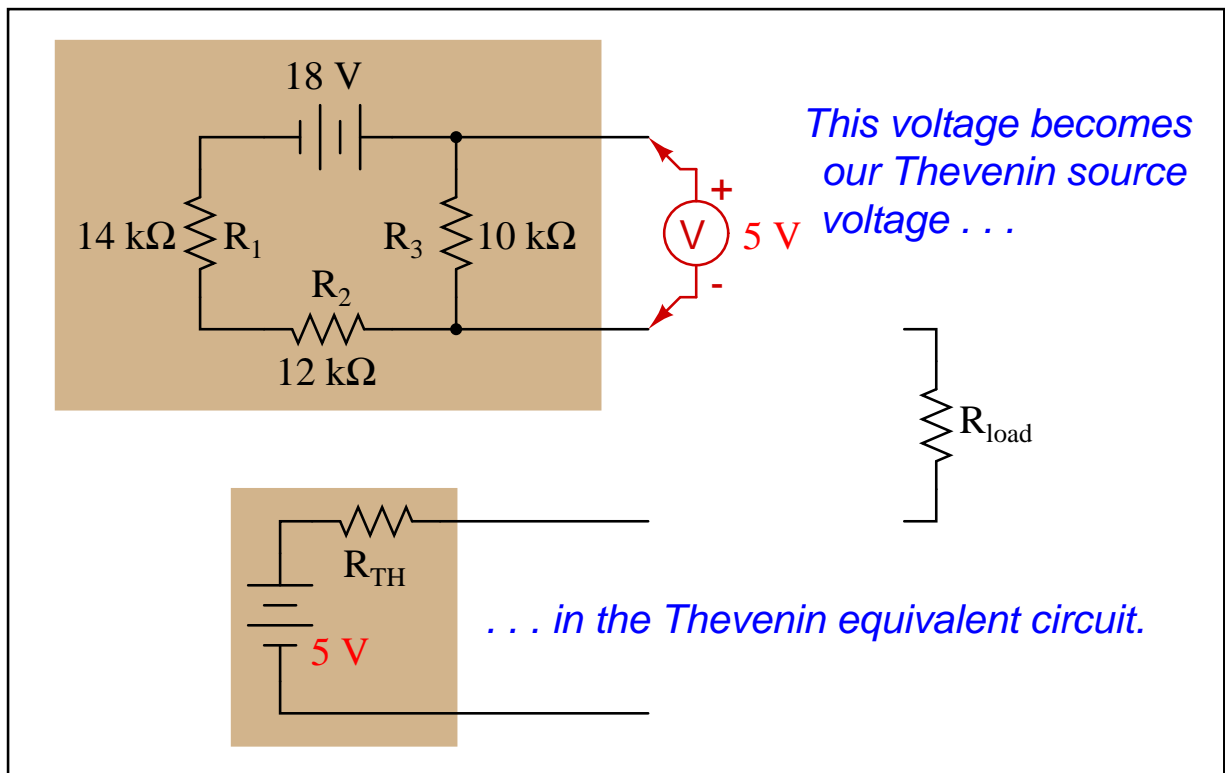


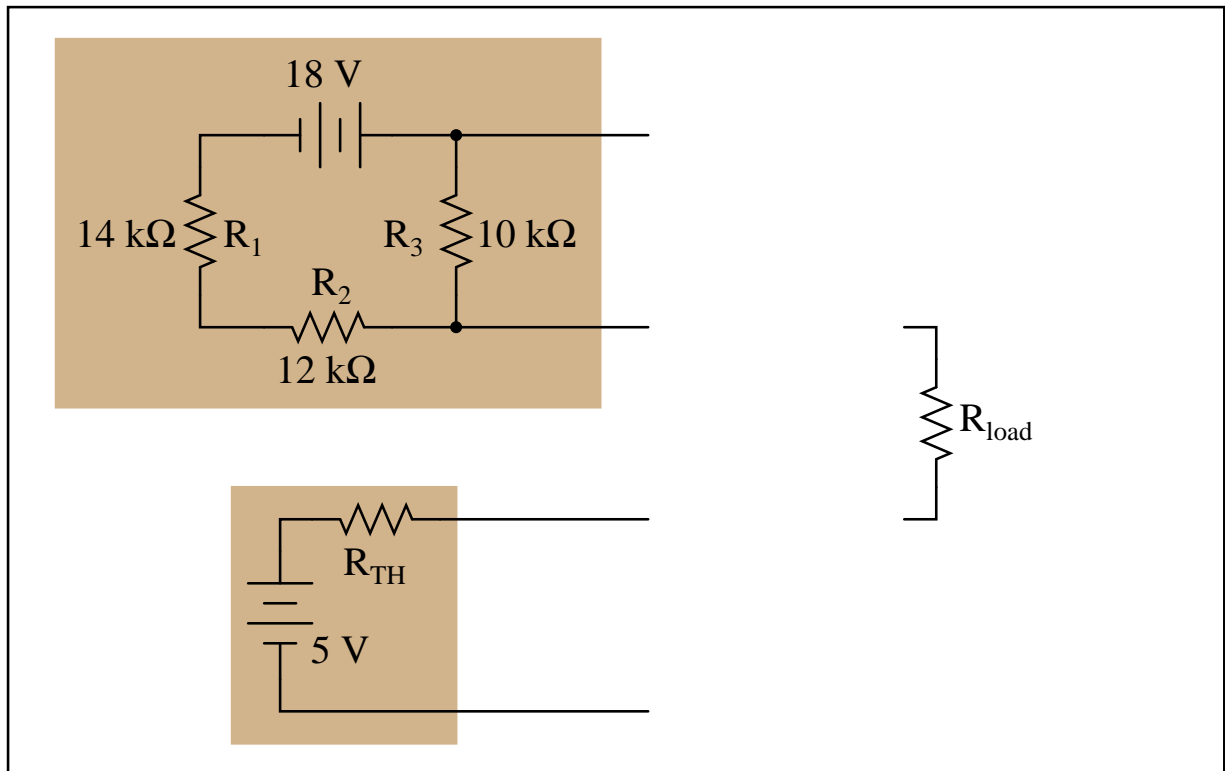


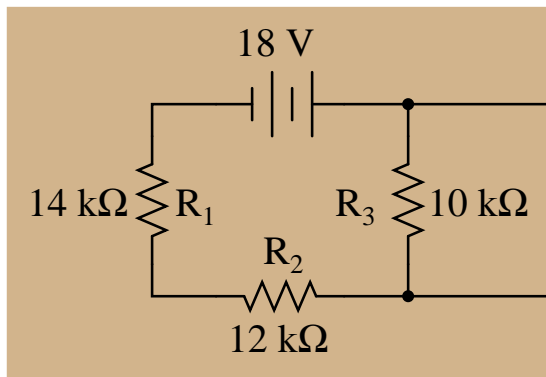




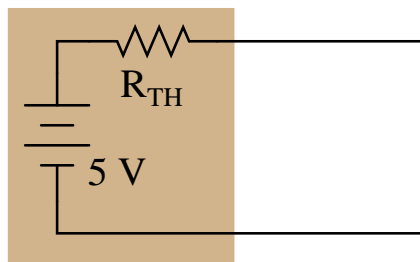
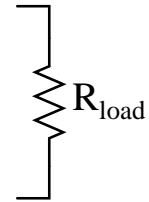


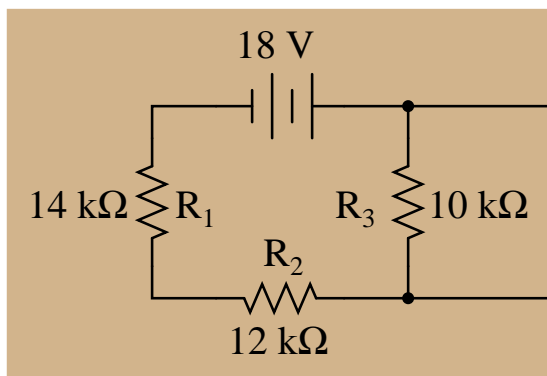






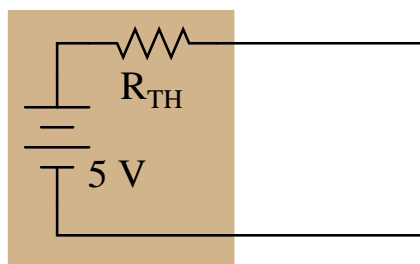
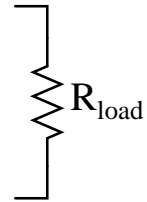
Now we replace each source in the original circuit with its own internal resistance.

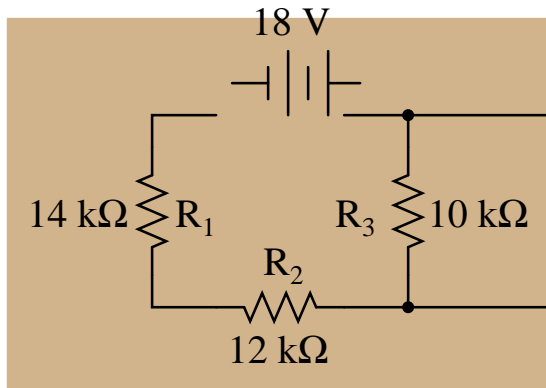




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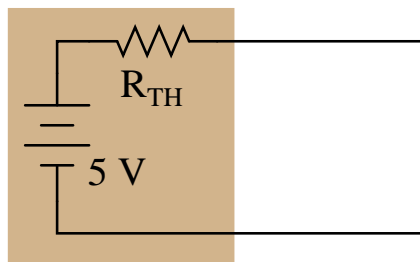
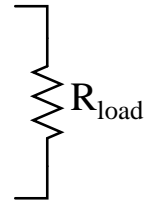
For voltage sources, this means a short-circuit.

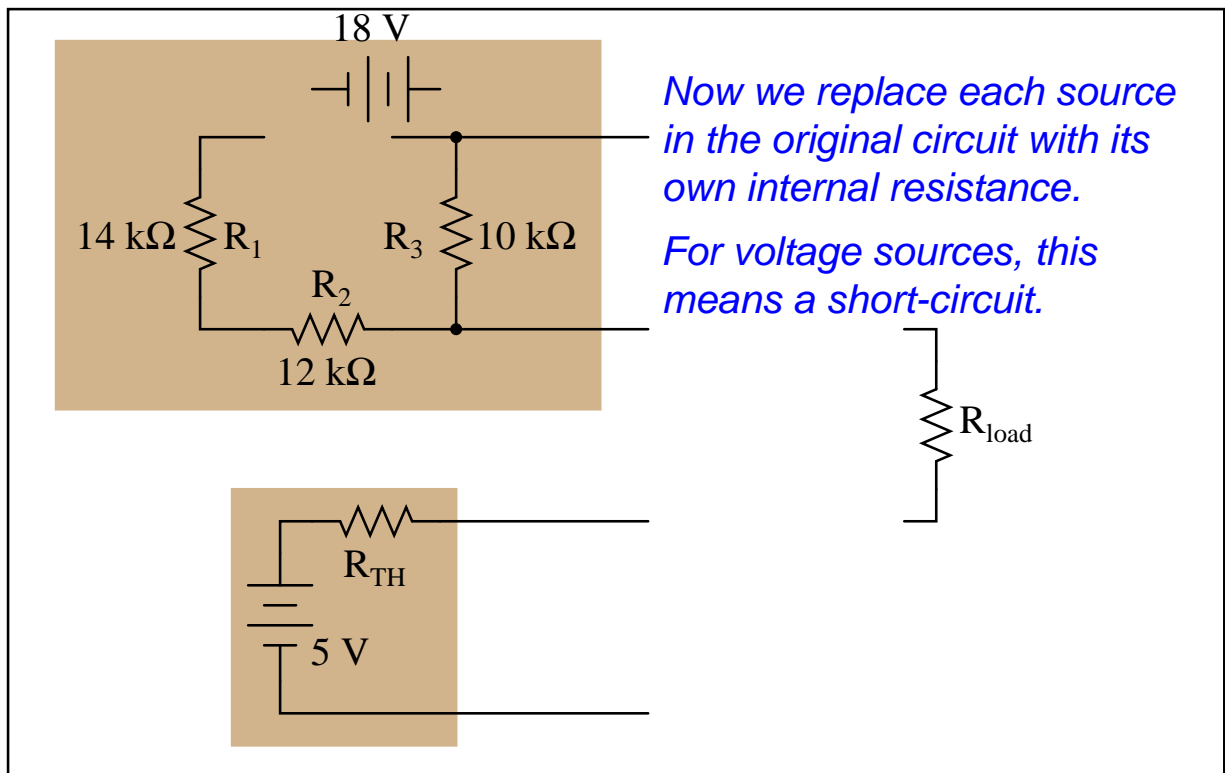


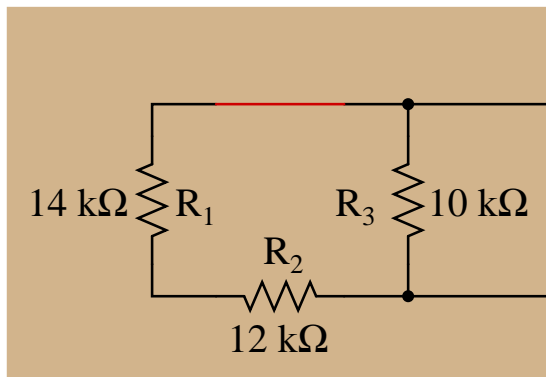


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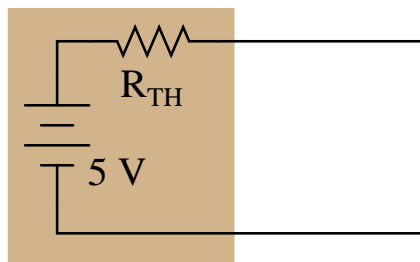
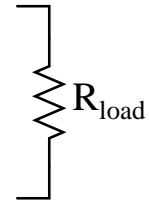


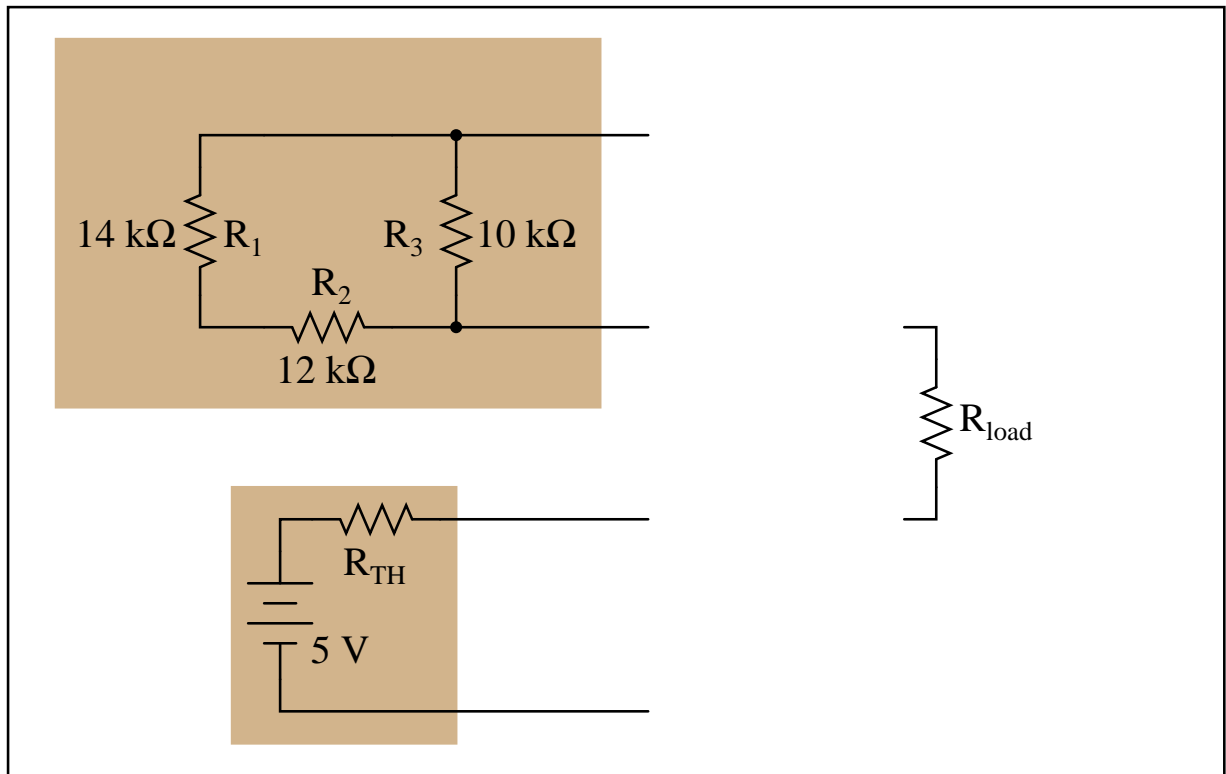


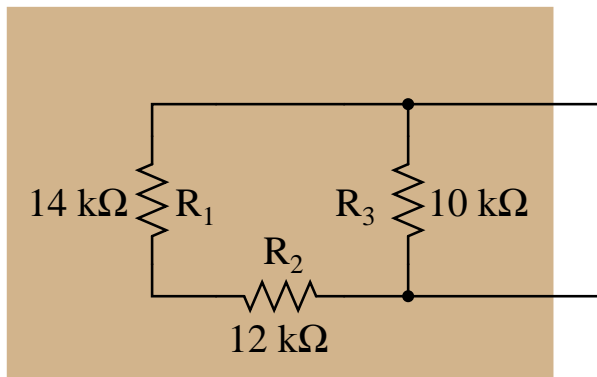


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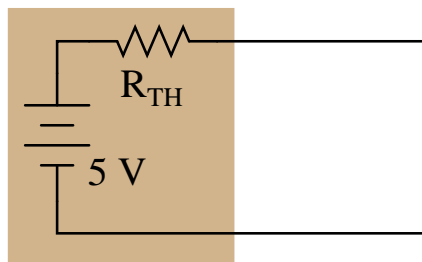
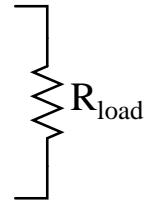
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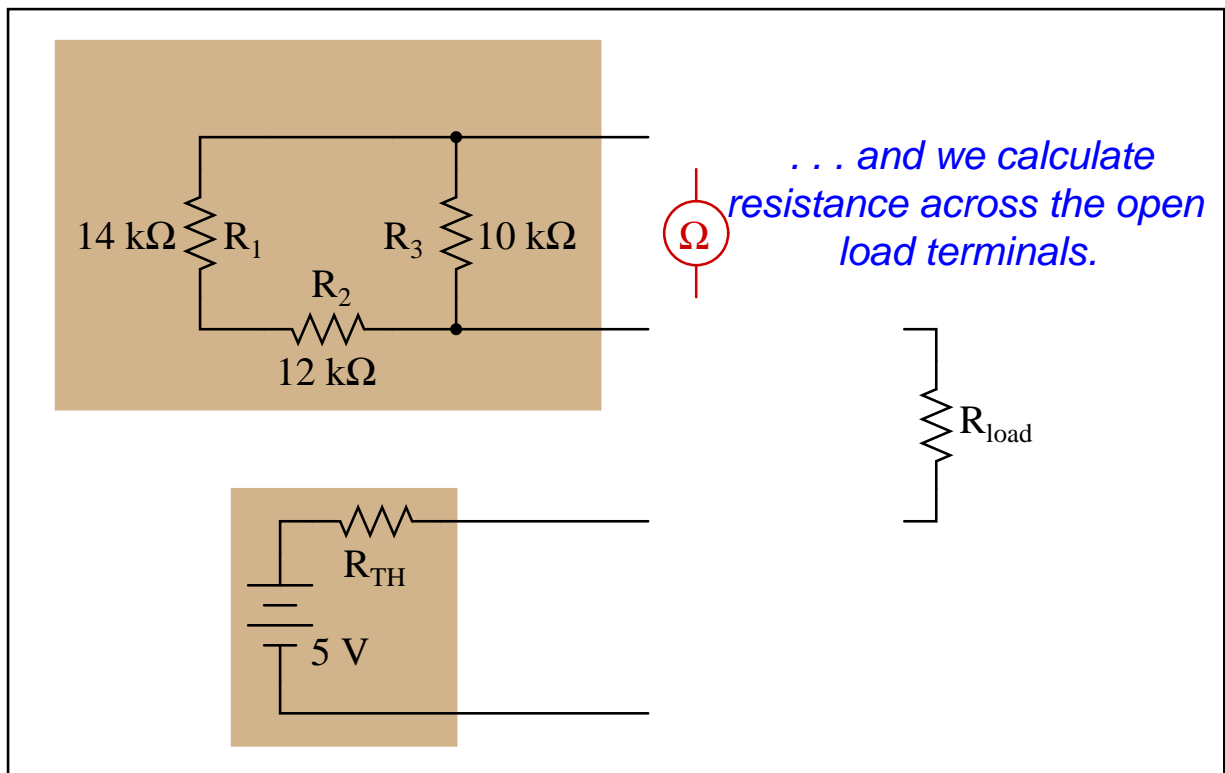


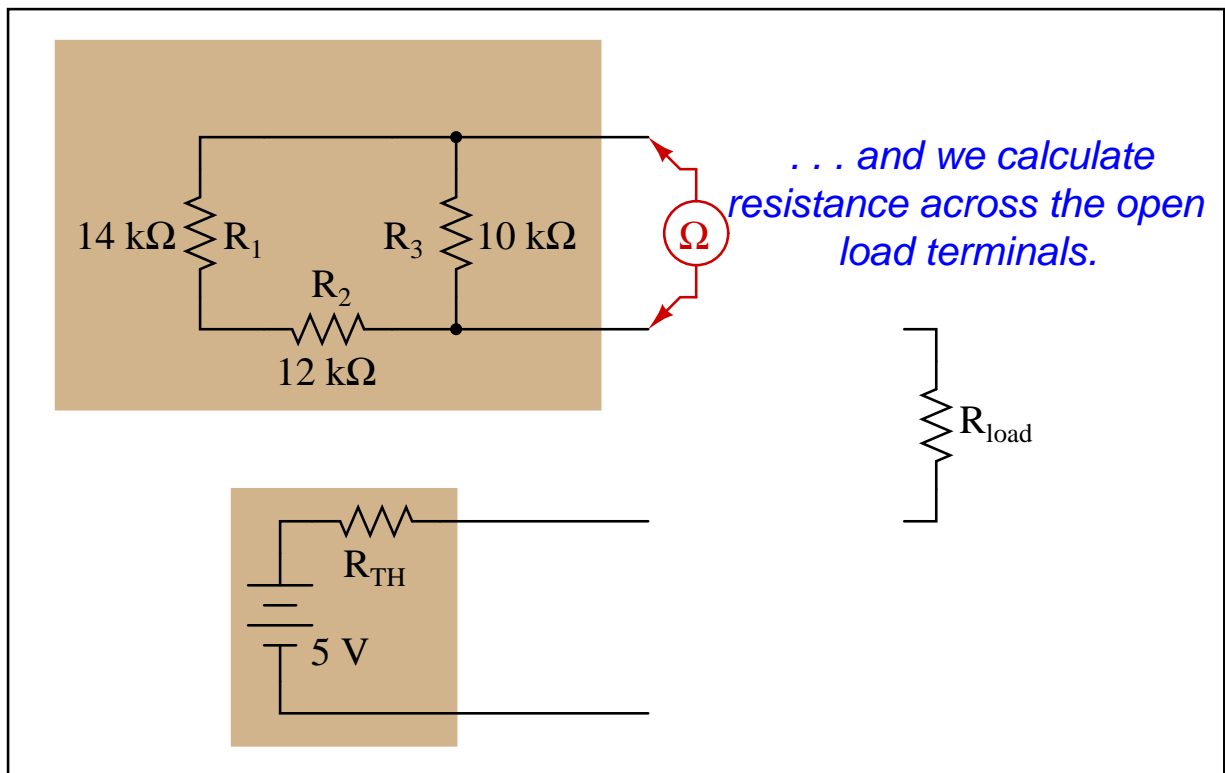


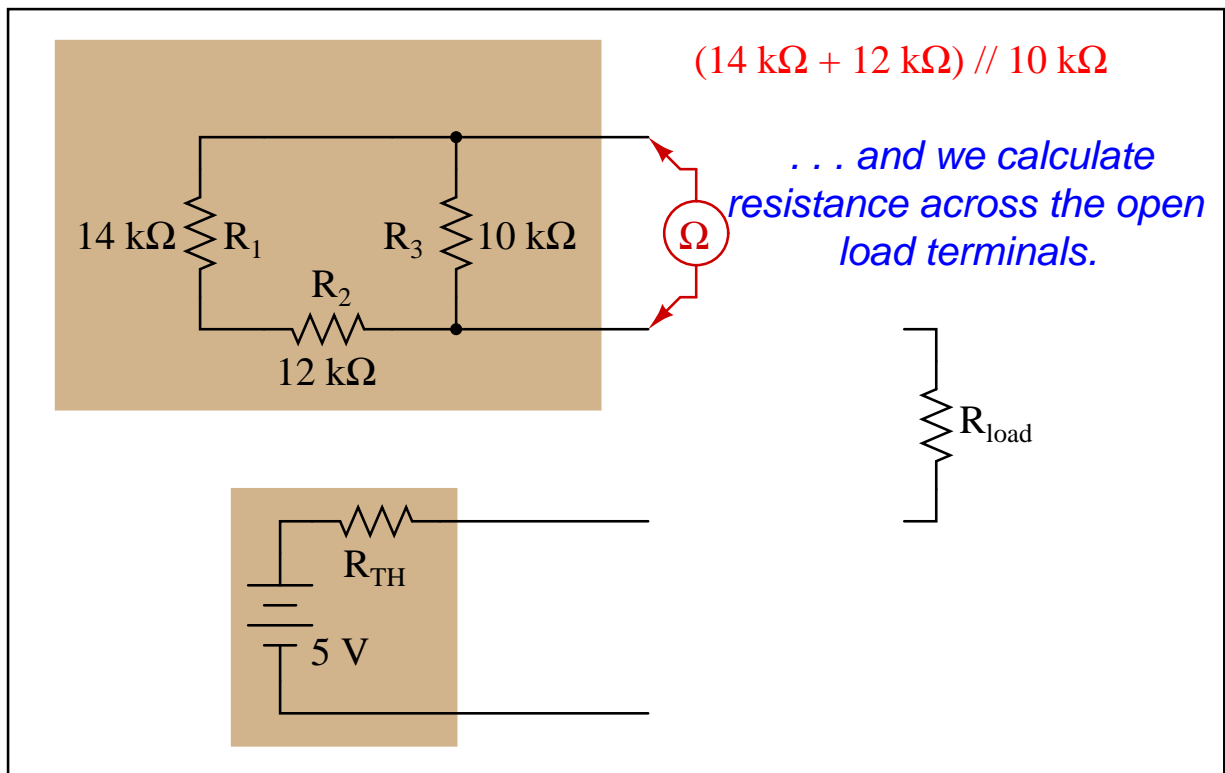


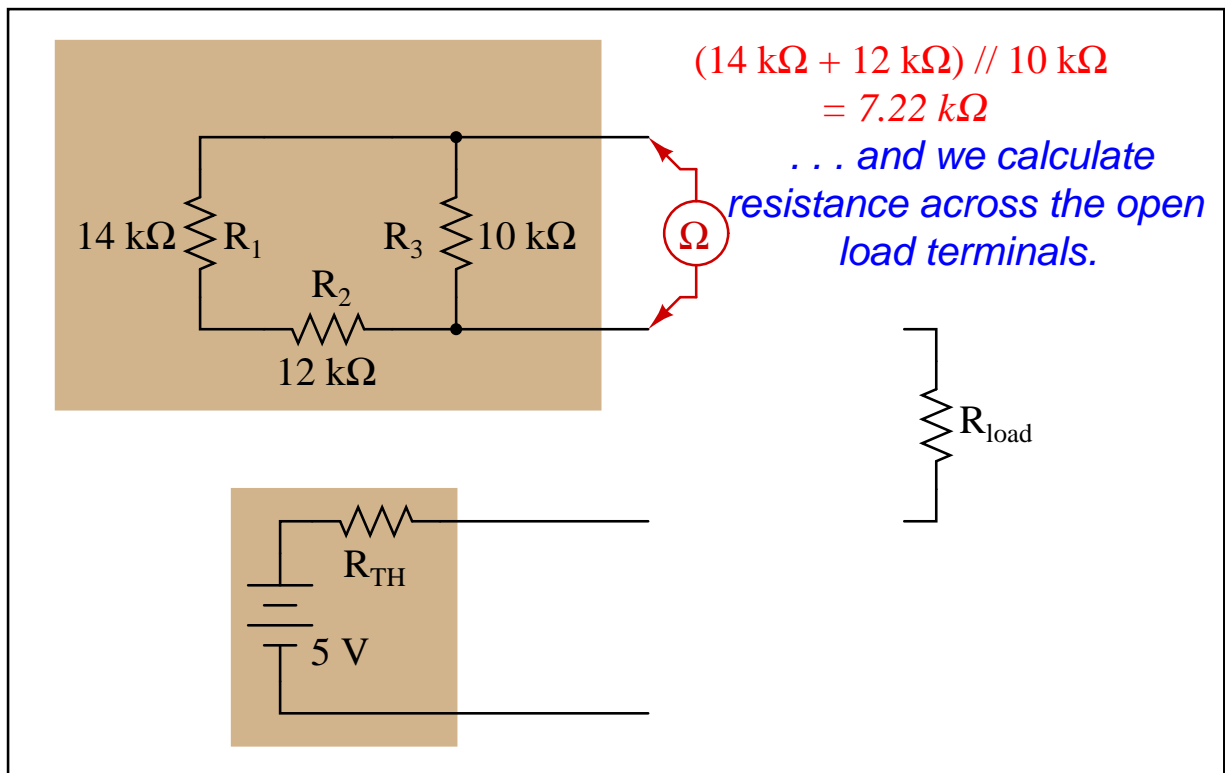
*... and we calculate
resistance across the open
load terminals.*

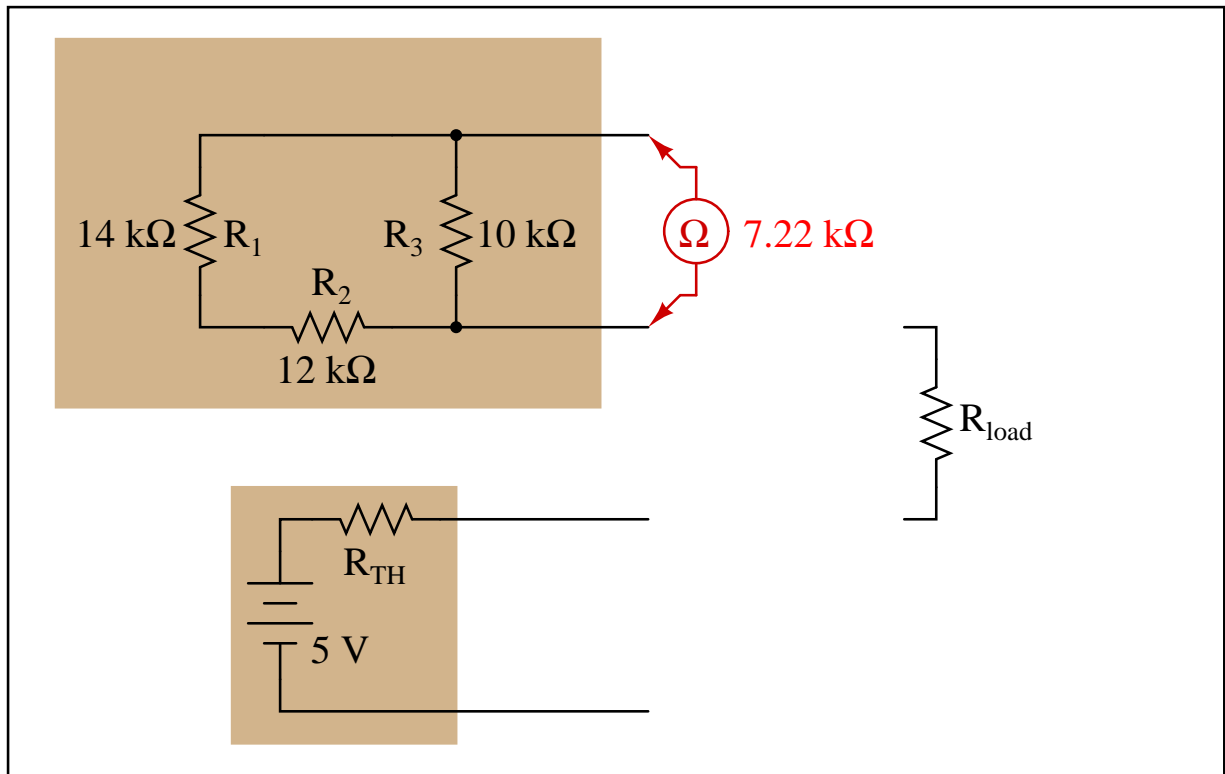


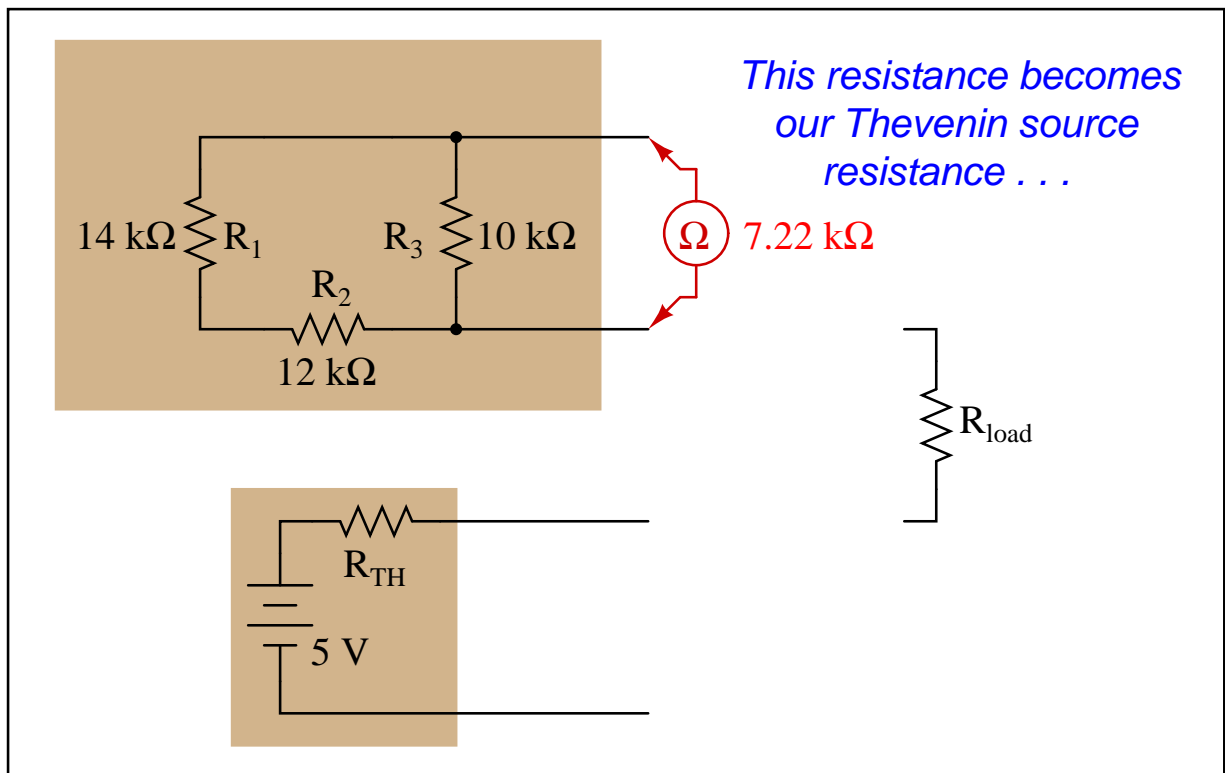


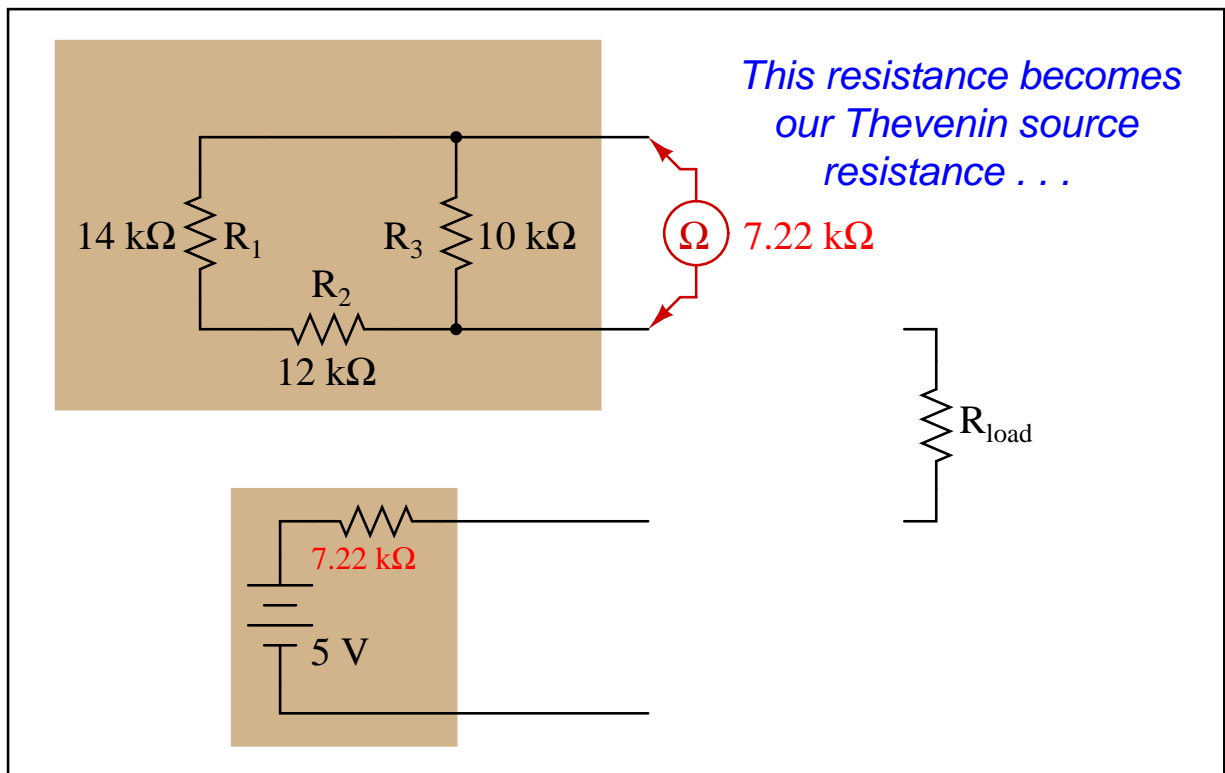


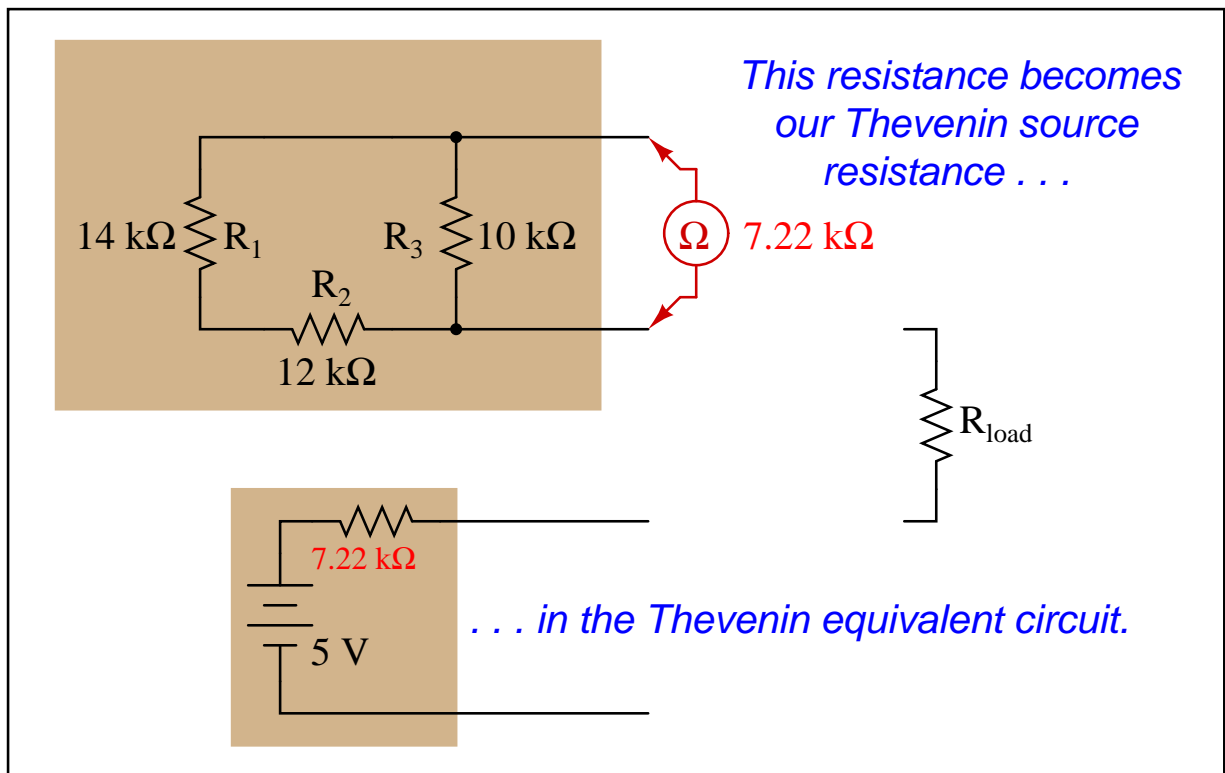


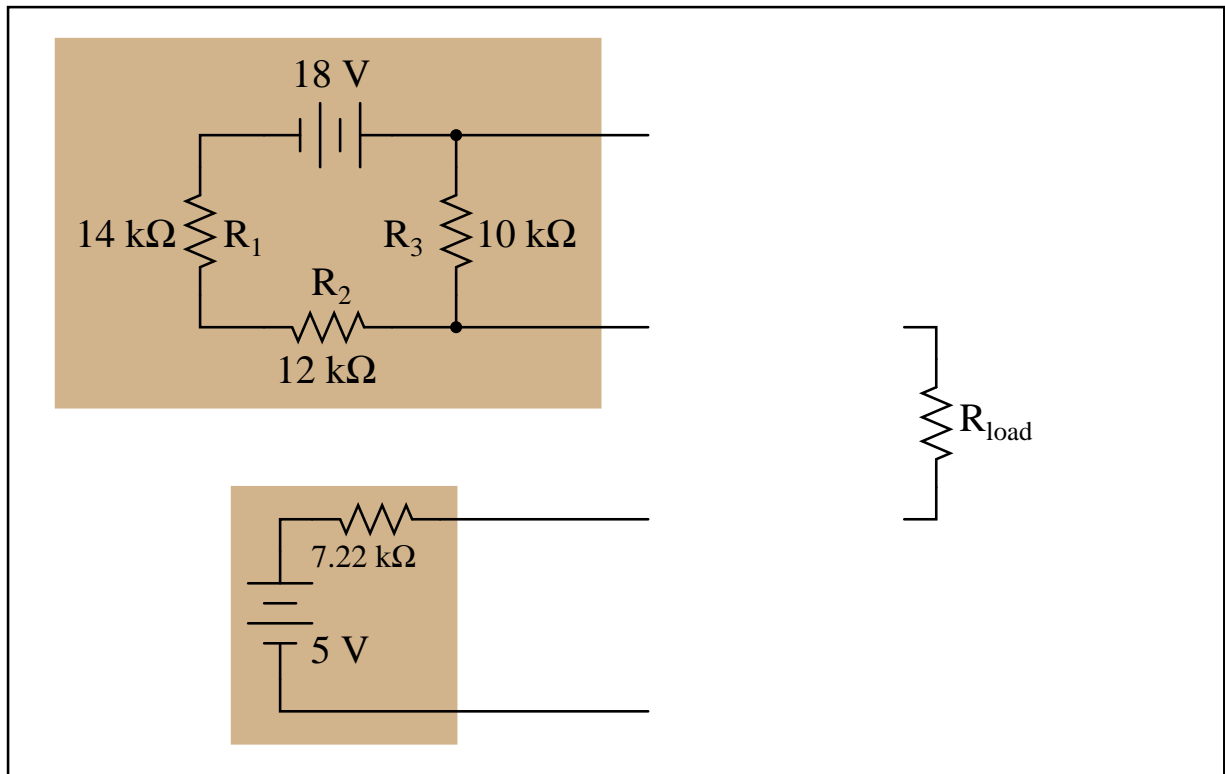


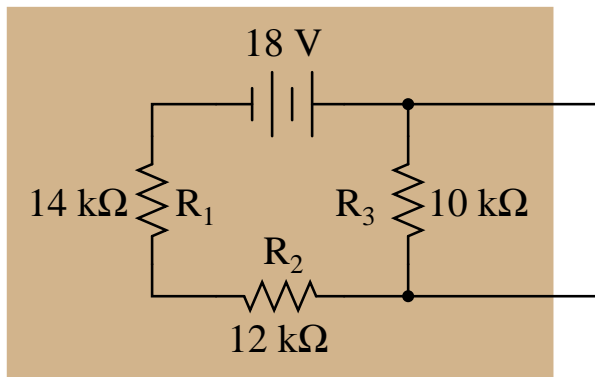




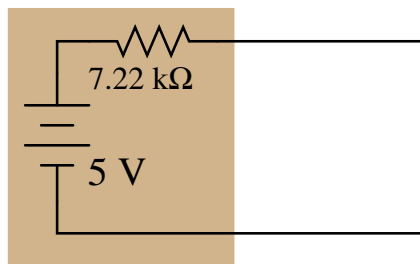
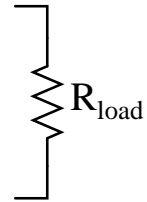


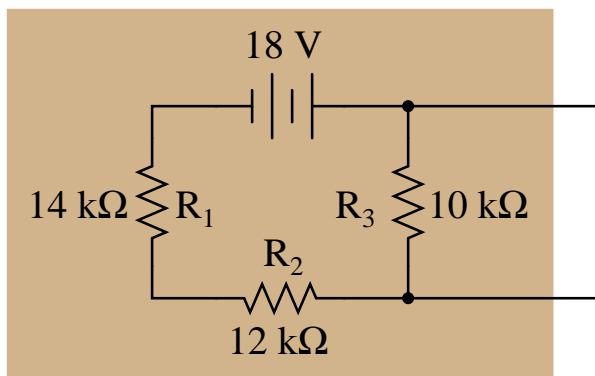




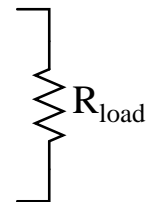
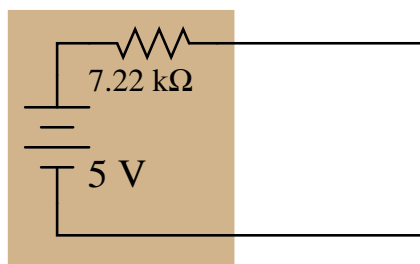


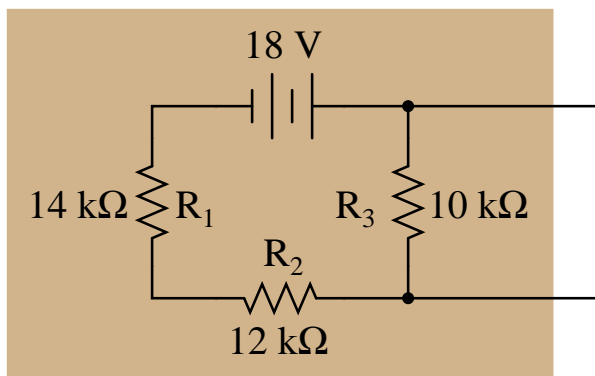
Now that we have an equivalent circuit to work with, we may insert the load there to see what happens!



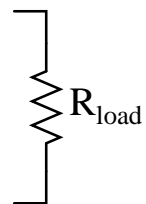
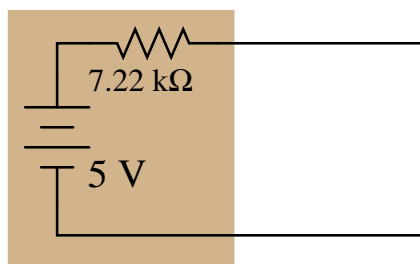


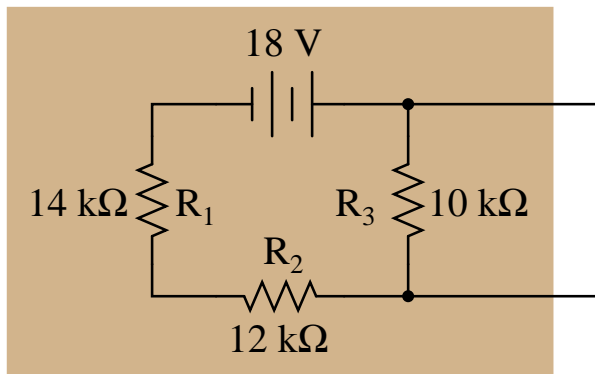
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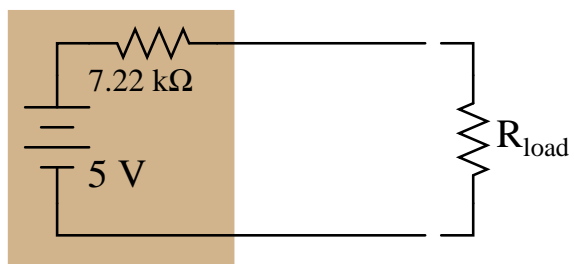


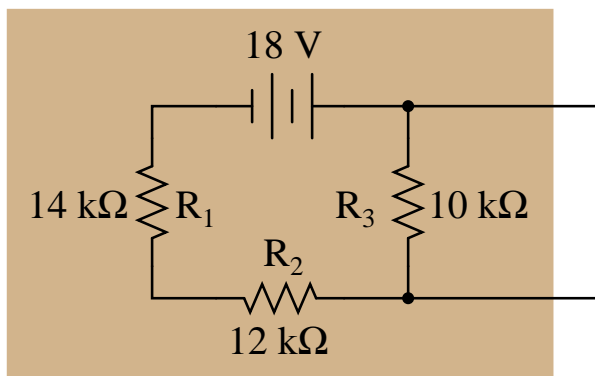
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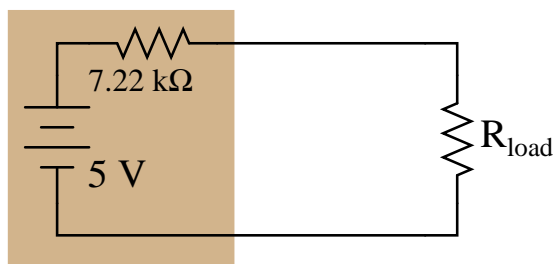


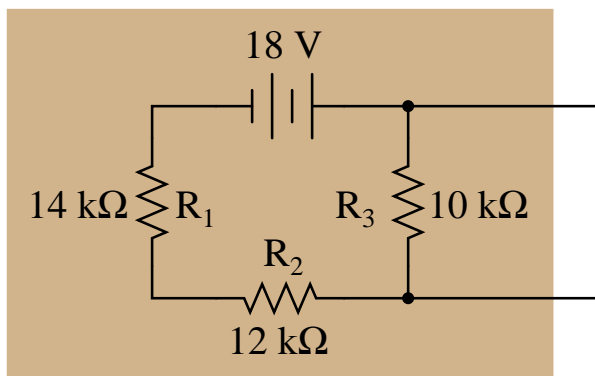
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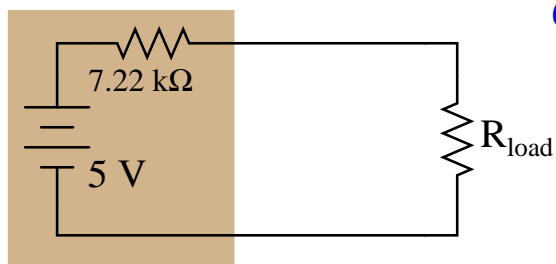


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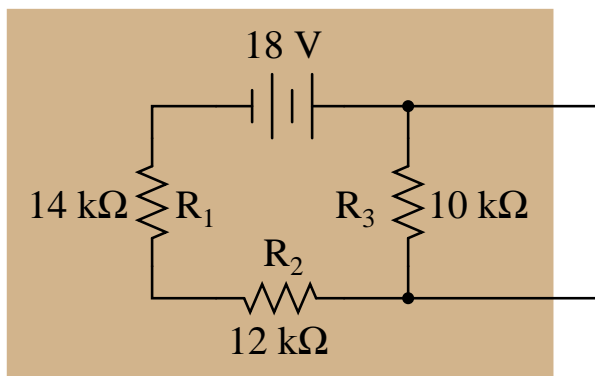




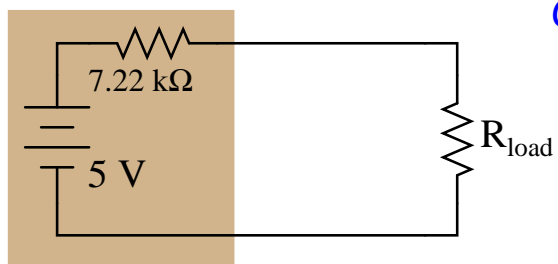
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Calculate:

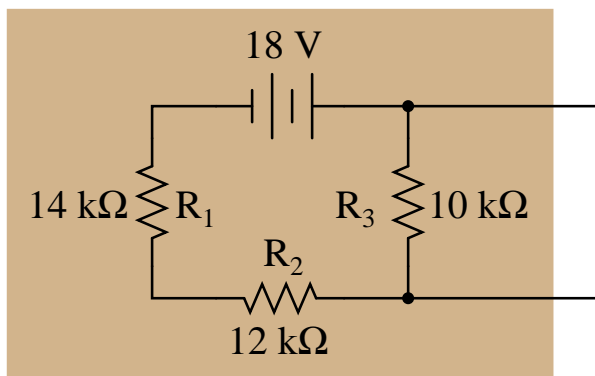


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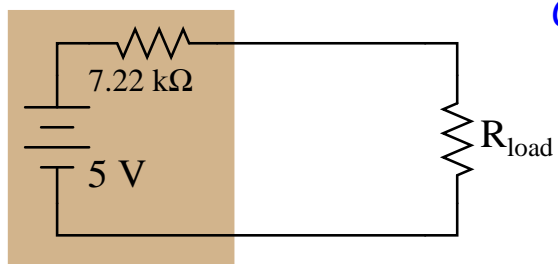


Calculate:

V_{load}



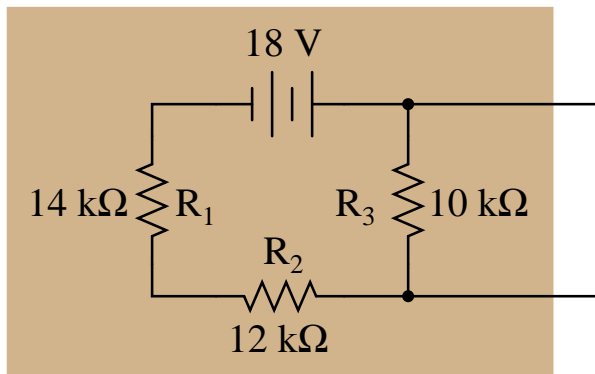
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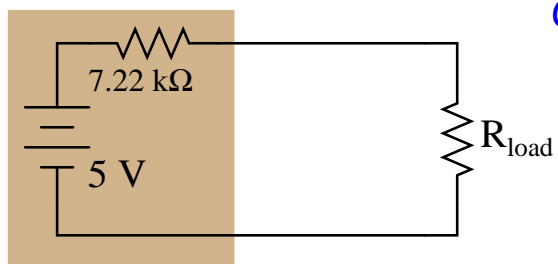
Calculate:

V_{load}

I_{load}



Now that we have an equivalent circuit to work with, we may insert the load there to see what happens!

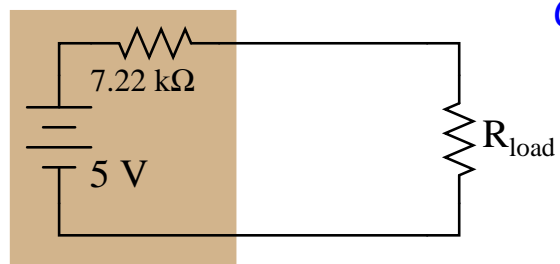
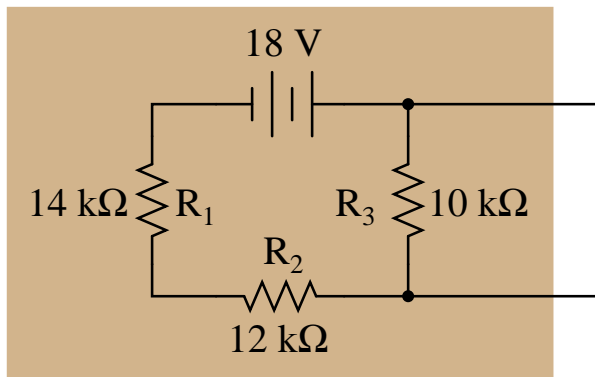


Calculate:

V_{load}

I_{load}

P_{load}

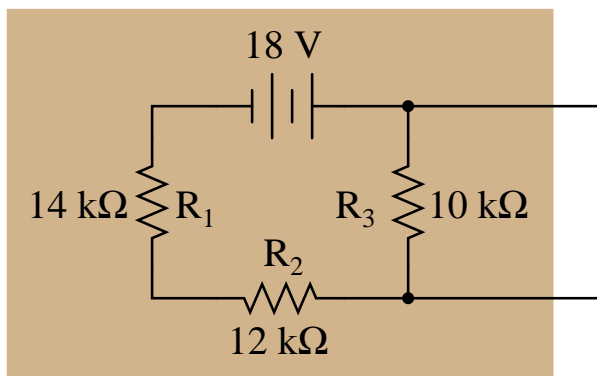


Calculate:

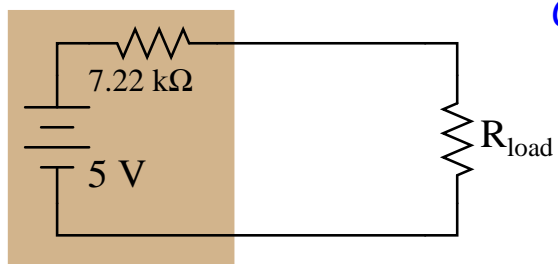
V_{load}

I_{load}

P_{load}



These load calculations will reflect what happens in the original circuit!

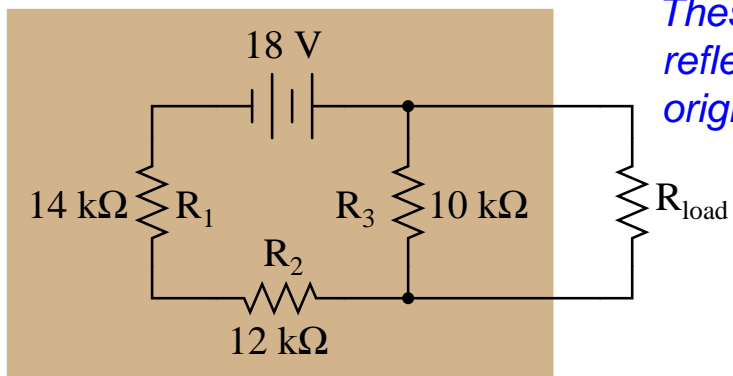


Calculate:

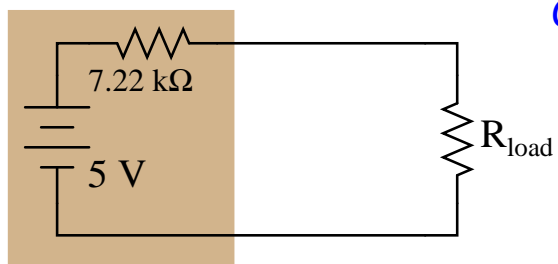
V_{load}

I_{load}

P_{load}



These load calculations will reflect what happens in the original circuit!

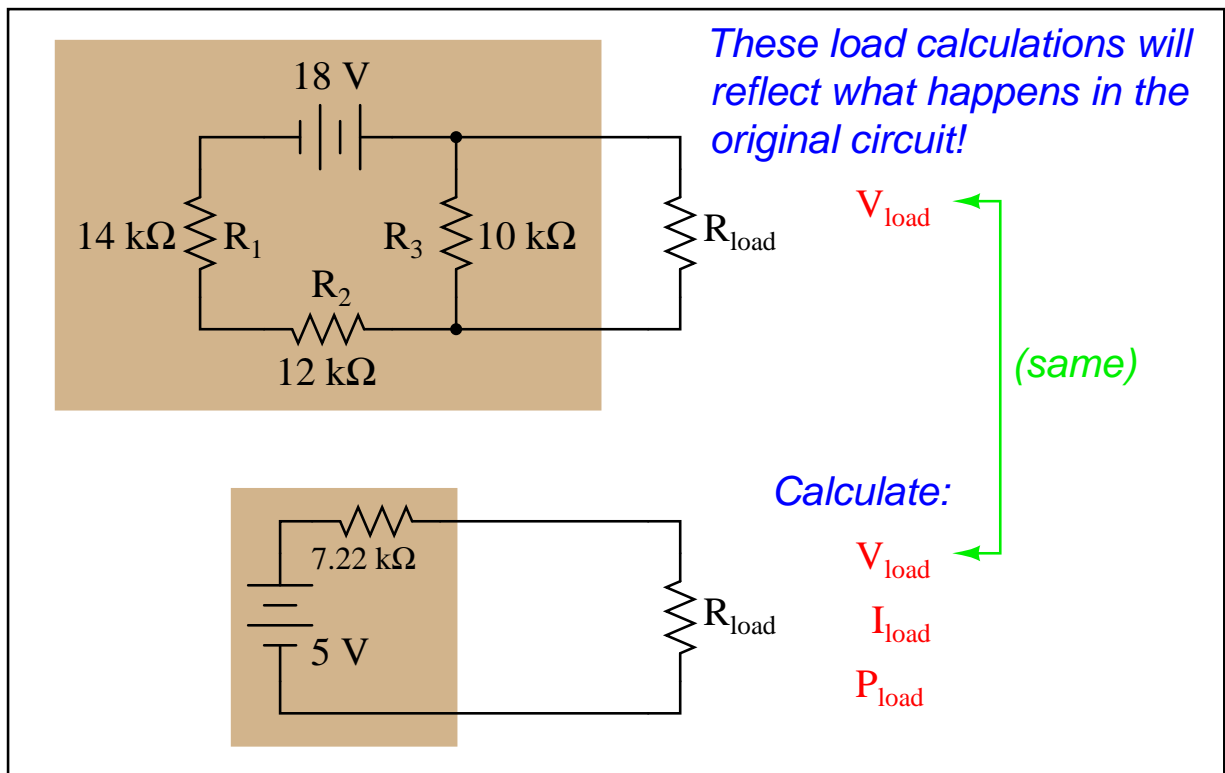


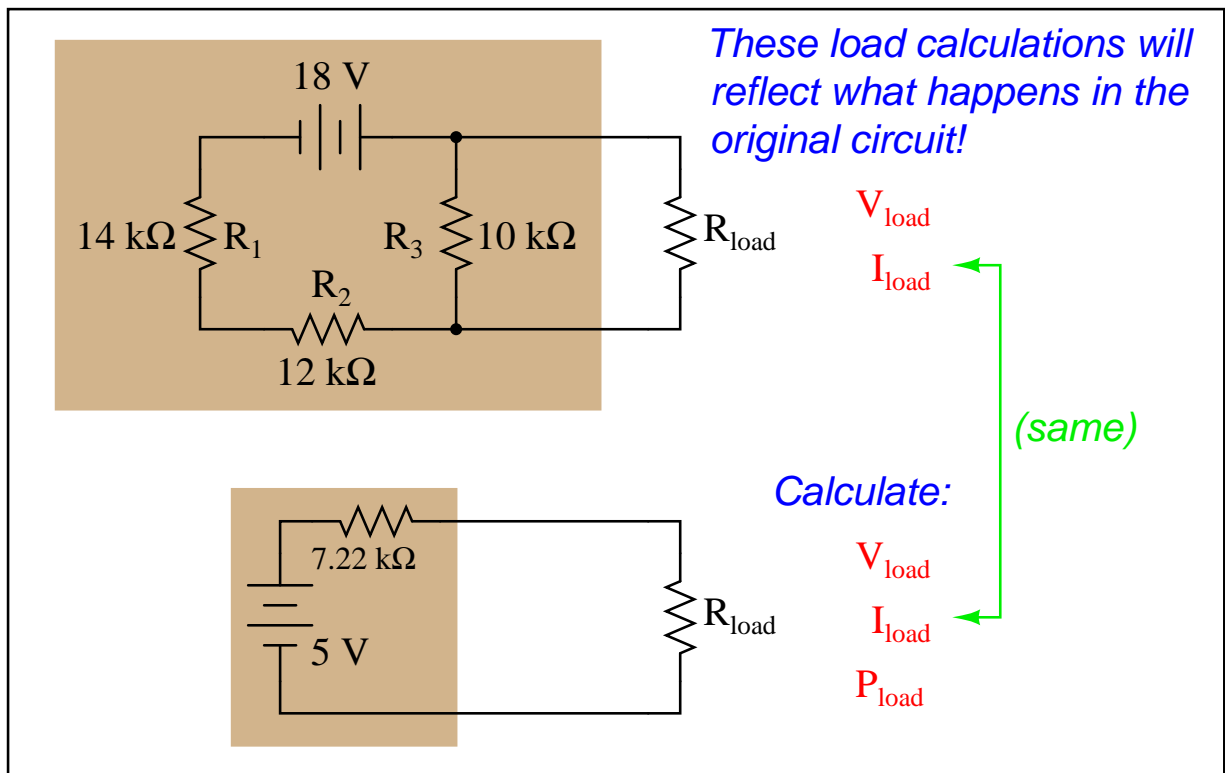
Calculate:

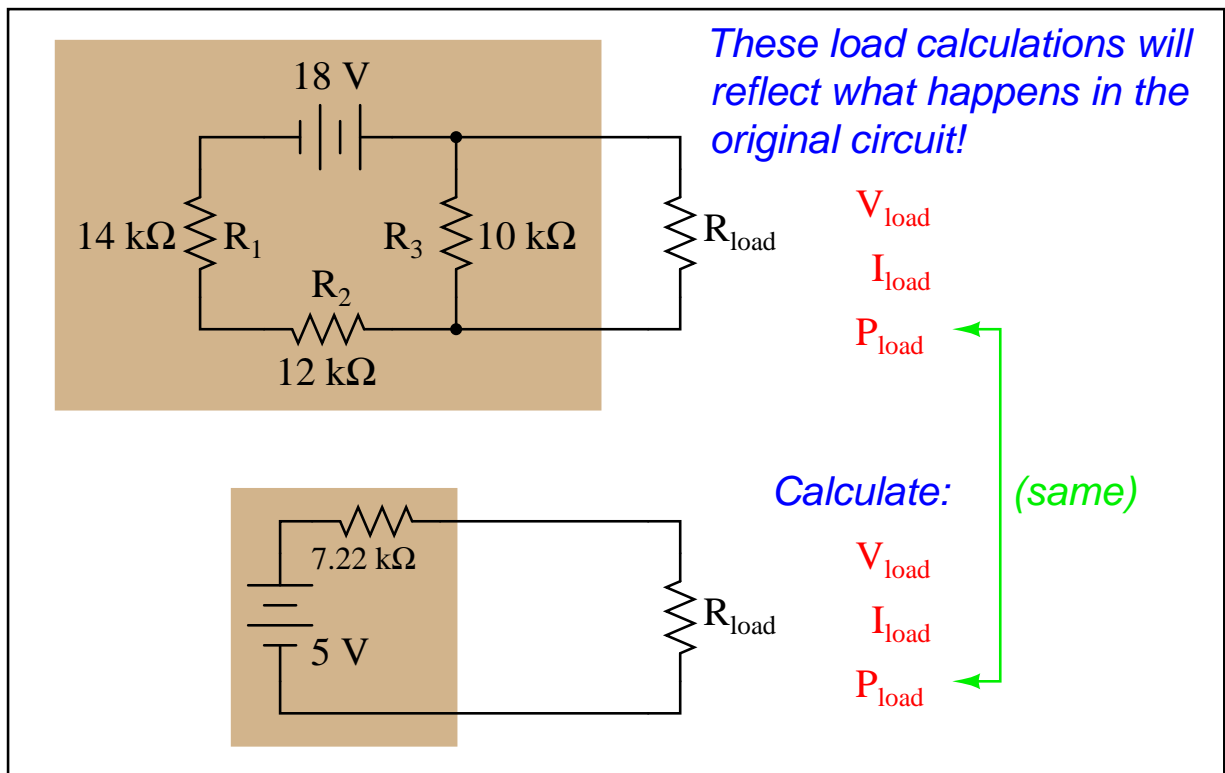
V_{load}

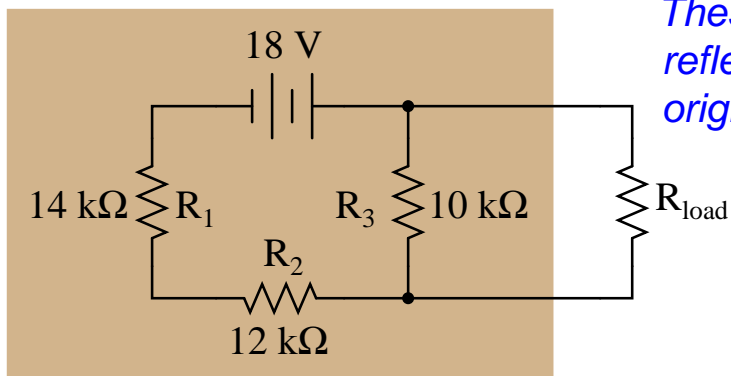
I_{load}

P_{load}



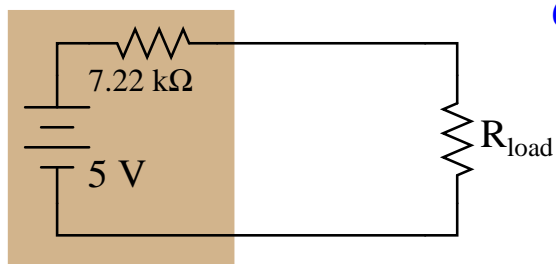






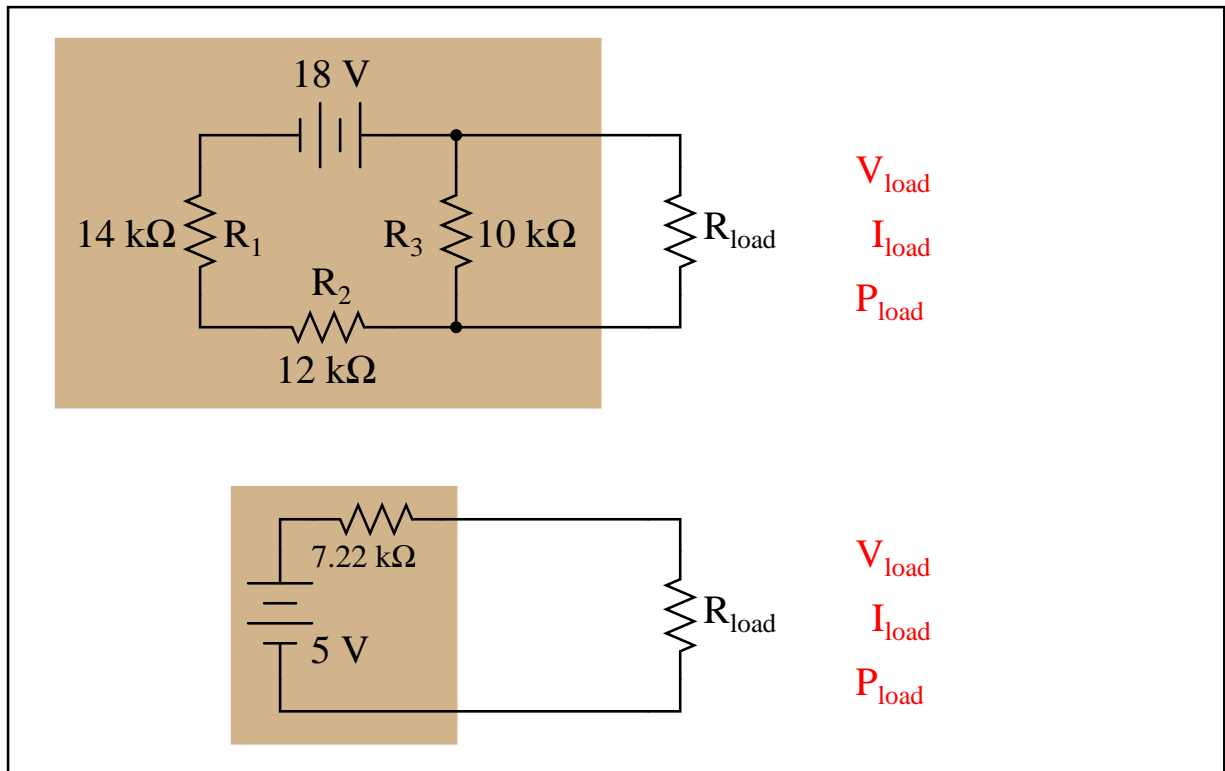
These load calculations will reflect what happens in the original circuit!

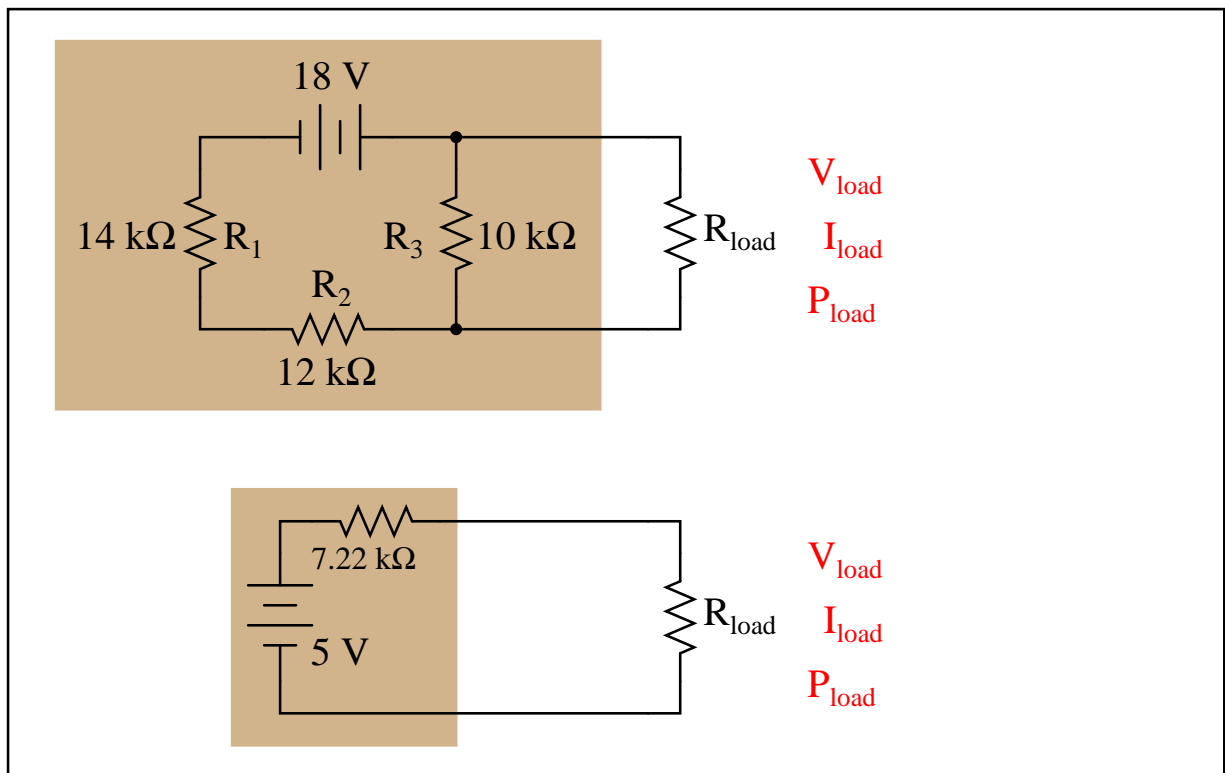
V_{load}
 I_{load}
 P_{load}

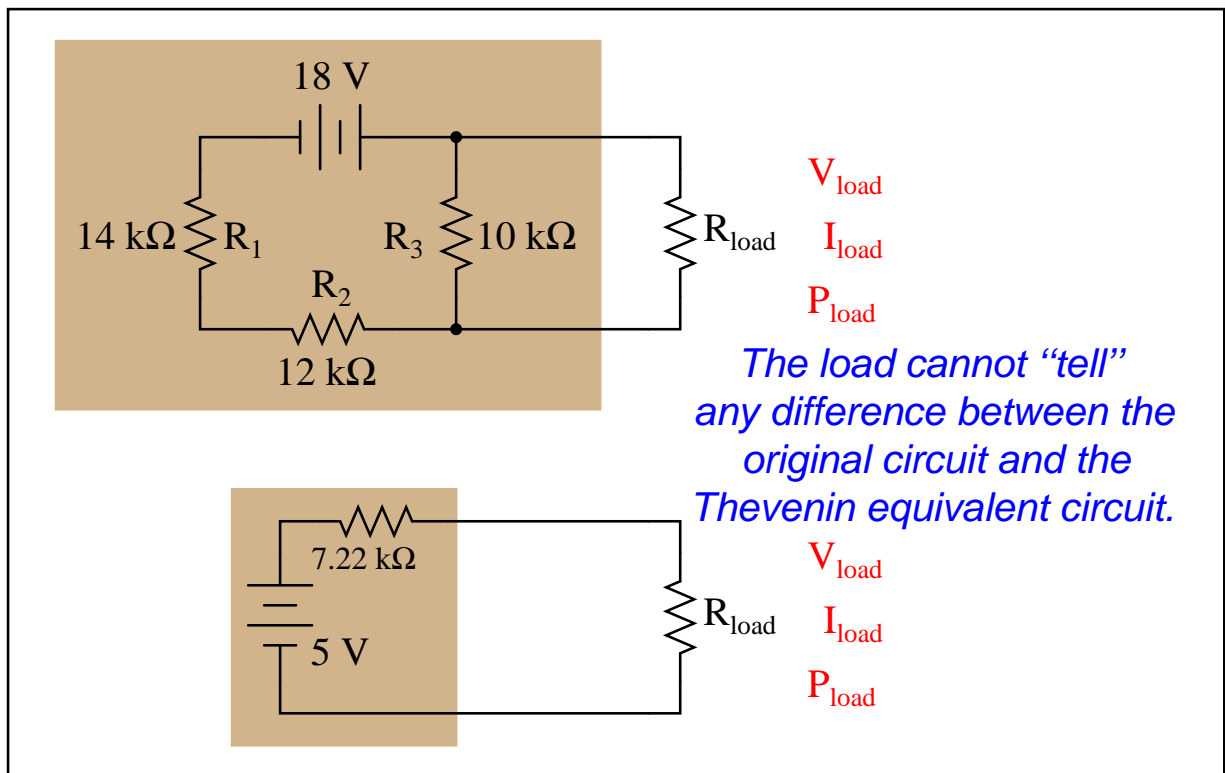


Calculate:

V_{load}
 I_{load}
 P_{load}







file 03261

Answers

Answer 1

Nothing to note here.

Notes

Notes 1

The purpose of this animation is to let students see how Thévenin's theorem may be applied to the simplification of a resistor network.