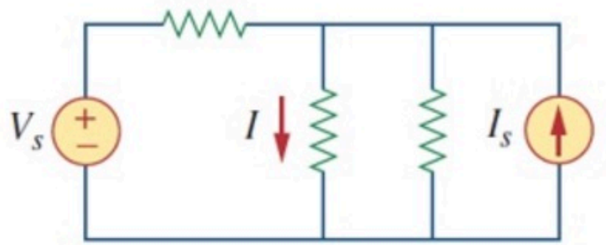
PP Circuit theorems 001

Unlimited Attempts.

When $V_S = 3$ V and $I_S = -2$ mA, you measure $I = 5$ mA.

When $V_S = 2$ V and $I_S = 0$ mA, you measure $I = 6$ mA.

When $V_S = 1$ V and $I_S = 3$ mA, what will I be?



Given Variables:

. : . .

Calculate the following:

I (A) :

0.009 ✓

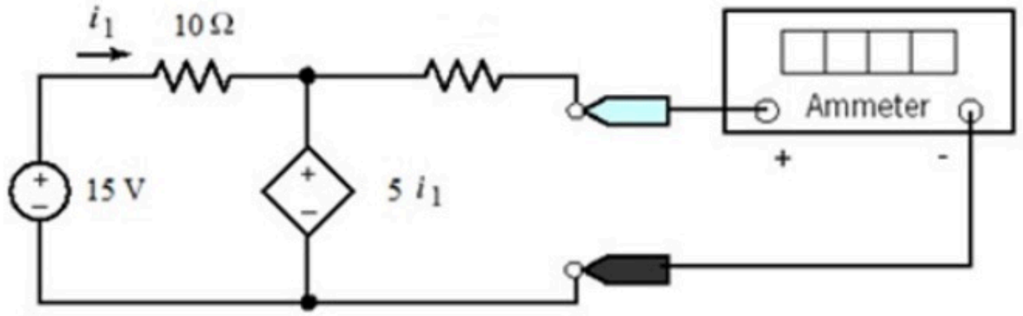
Hint: Check the units

PP Circuit theorems 002

Unlimited Attempts.

You build the circuit below and use an ammeter to measure the current through the unknown resistor. The ammeter reading is 0.1 A.

Now someone changes the voltage source from 15V to 30V, but leaves everything else unchanged. What will be the new reading X of the ammeter?



Given Variables:

. : . .

Calculate the following:

X (A) :

0.2 ✓

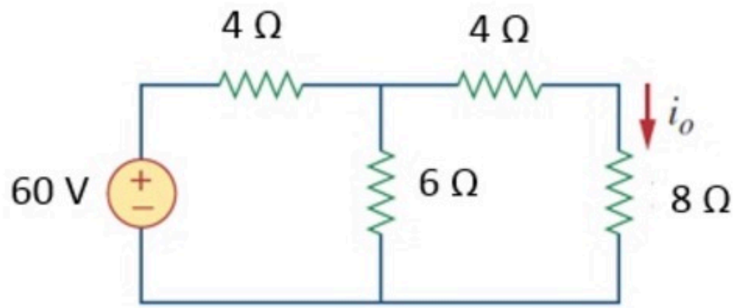
Hint: Is the system linear? What does that mean in terms of input - output?

PP Circuit theorems 003

Unlimited Attempts.

Find the current i_o.

What voltage X do we need to change the 60 V voltage source to in order to make i_o = 7.5 A ?



Given Variables:

. : . .

Calculate the following:

io (A) :

2.5 ✓

X (V) :

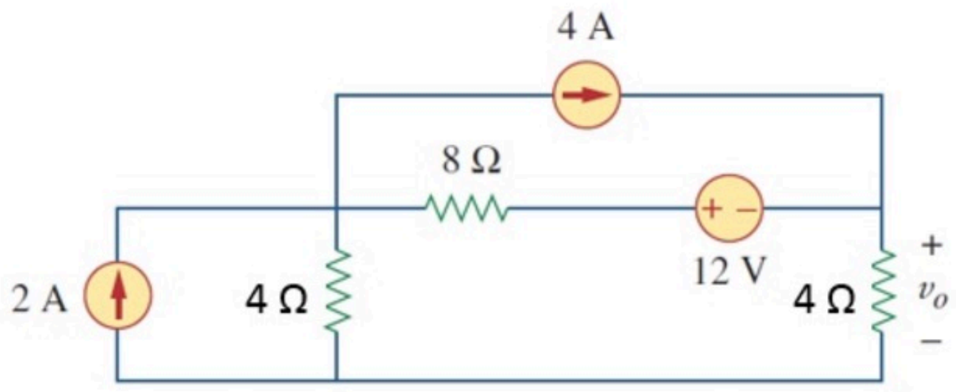
180 ✓

Hint: To find X, use linearity.

PP Circuit theorems 004

Unlimited Attempts.

Use superposition to find v_o.



Given Variables:

. : . .

Calculate the following:

vo (V) :

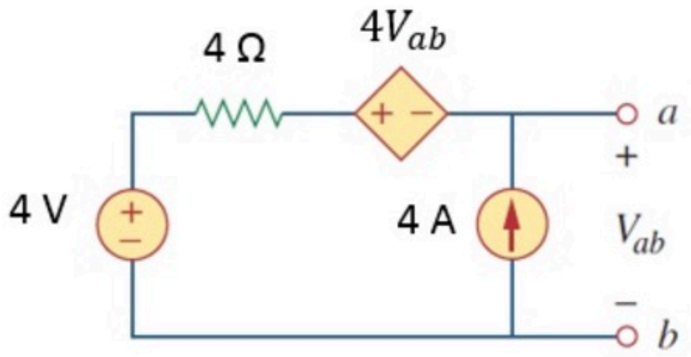
7 ✓

Hint: Mind the signs.

PP Circuit theorems 005

Unlimited Attempts.

Use superposition to find V_{ab}.



Given Variables:

. : . .

Calculate the following:

Vab (V) :

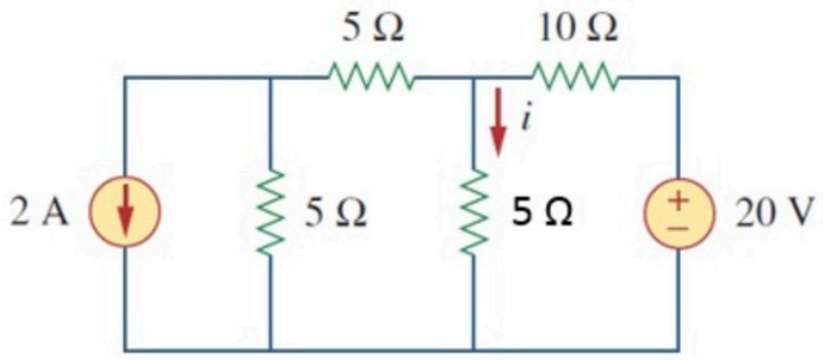
4

Hint: Always keep the dependent source.

PP Circuit theorems 006

Unlimited Attempts.

Use source transformations to find i.



Given Variables:

. : . .

Calculate the following:

i (A) :

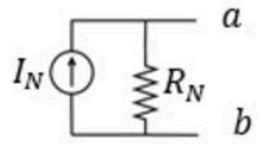
0.5 ✓

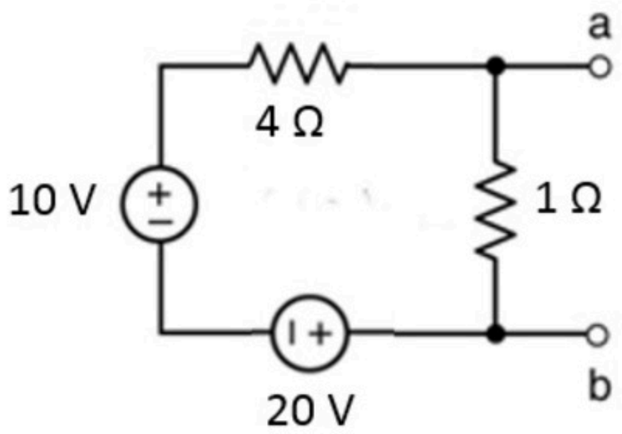
Hint: Make sure you use the correct transformations.

PP Circuit theorems 007

Unlimited Attempts.

Find the Norton equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

RN (ohm) :

0.8 ✓

IN (A) :

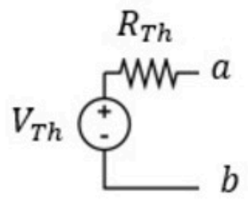
-2.5 ✓

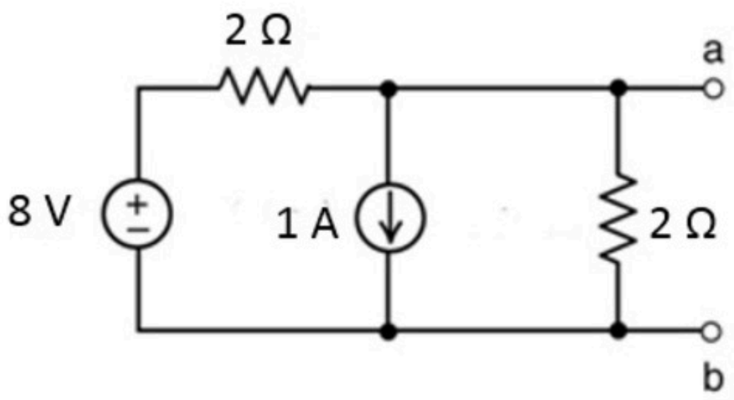
Hint: Try finding RN directly. Mind the sign of IN.

PP Circuit theorems 008

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

3 ✓

Rth (ohm) :

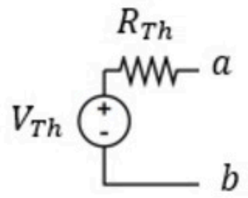
1 ✓

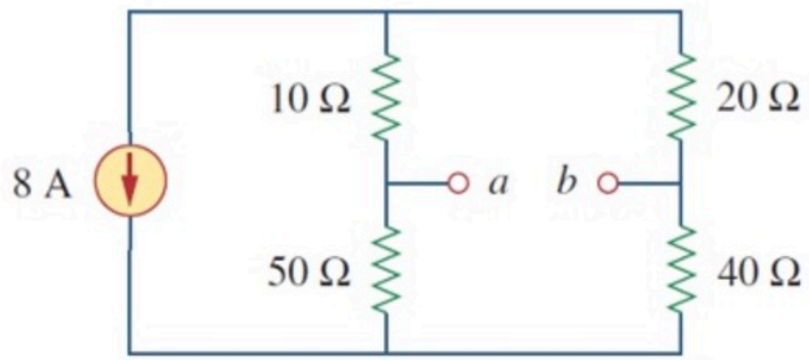
Hint: Try finding Rth directly. Find Voc with superposition.

PP Circuit theorems 009

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

-40 ✓

Rth (ohm) :

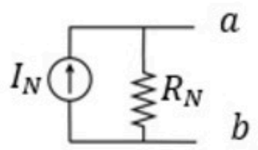
22.5 ✓

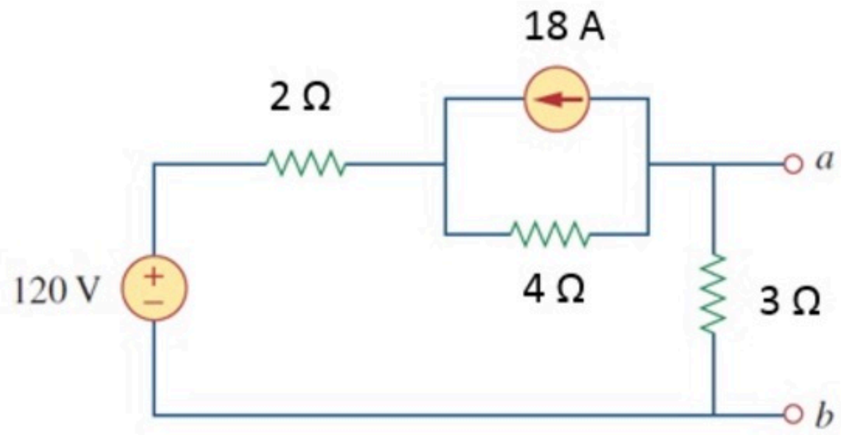
Hint: Find Voc using current dividers.

PP Circuit theorems 010

Unlimited Attempts.

Find the Norton equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

IN (A) :

8 ✓

RN (ohm) :

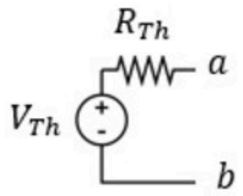
2 ✓

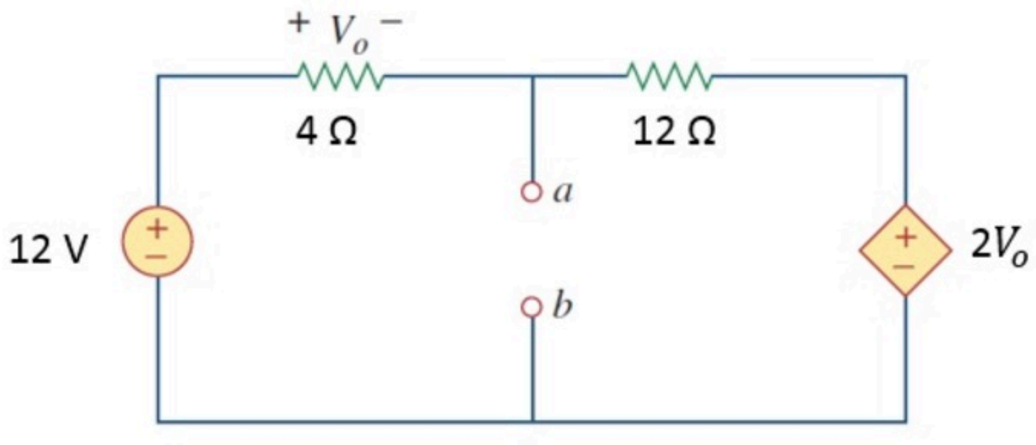
Hint: You can find Isc using superposition.

PP Circuit theorems 011

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

10 ✓

Rth (ohm) :

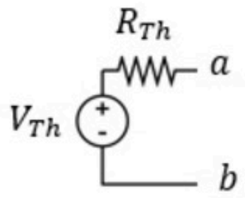
2 ✓

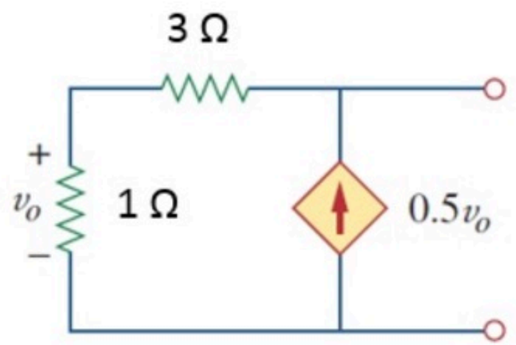
Hint: Find Voc; and then Isc or use a test source to find Rth.

PP Circuit theorems 012

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

0 ✓

Rth (ohm) :

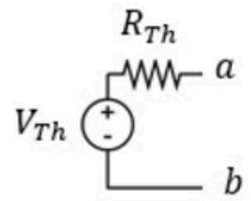
8 ✓

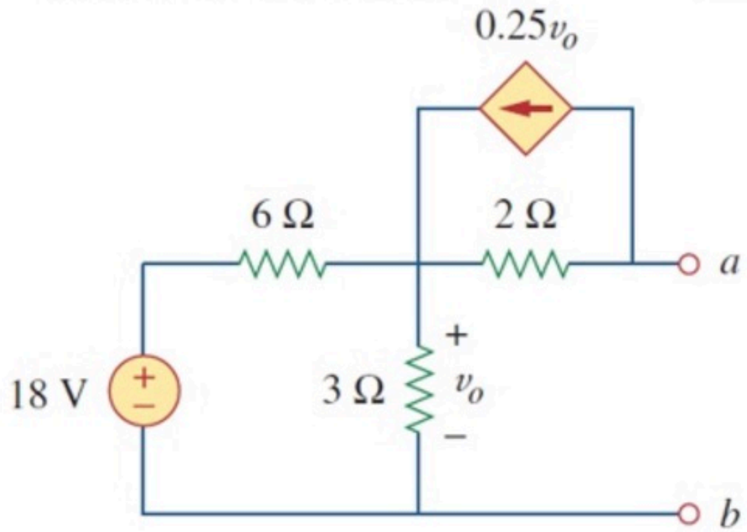
Hint: What do you expect Vth to be? Use test source for Rth.

PP Circuit theorems 013

Unlimited Attempts.

Find the Thevenin equivalent resistance of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Rth (ohm) :

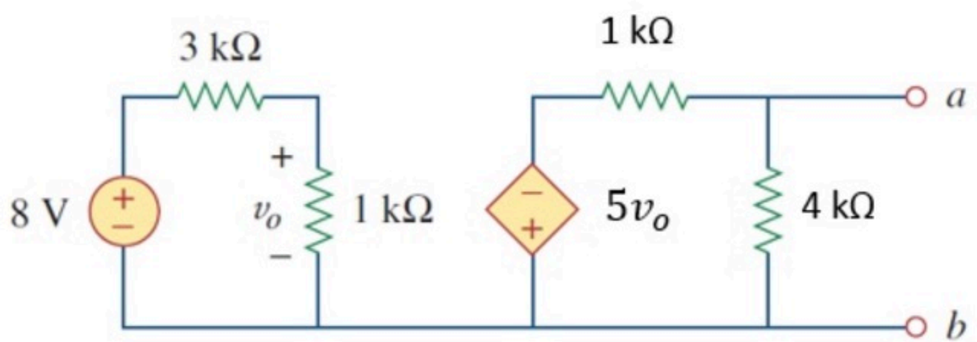
3 ✓

Hint: Try using a test source. Would you use a voltage or current test source?

PP Circuit theorems 014

Unlimited Attempts.

What resistor *R* connected between a and b will absorb maximum power?
What is this power *P*?
[Do not look up the equation for power.]



Given Variables:

. : . .

Calculate the following:

R (ohm) :

800 ✓

P (mW) :

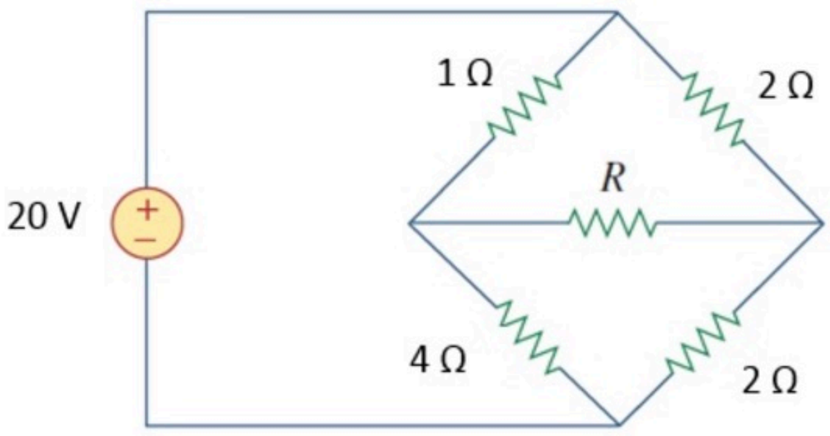
20 ✓

Hint: Find the Thevenin model first.

PP Circuit theorems 015

Unlimited Attempts.

What is the maximum power *P* that can be delivered to the variable resistor *R*? [Do not look up the equation for power.]



Given Variables:

. : . .

Calculate the following:

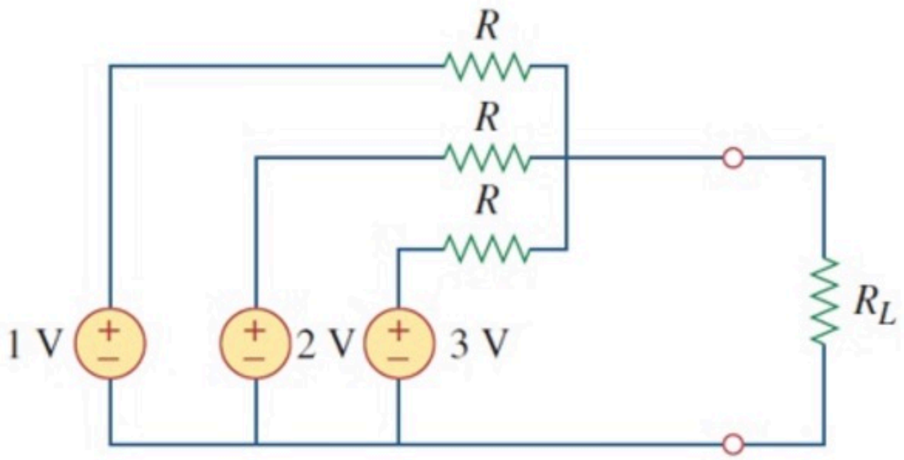
P (W) :

5 ✓

PP Circuit theorems 016

Unlimited Attempts.

Find *R* such that the maximum power delivered to the load is 12 mW.
[Do not look up the equation for power.]



Given Variables:

. : . .

Calculate the following:

R (ohm) :

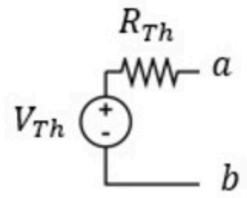
250 ✓

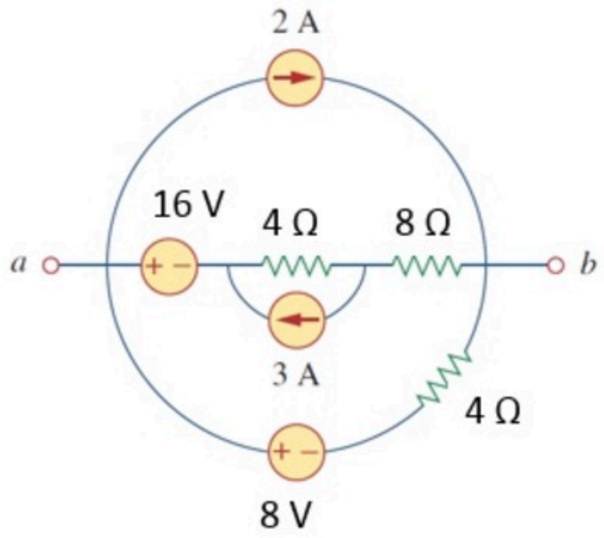
Hint: Find the Thevenin model first.

PP Circuit theorems 017

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

7 ✓

Rth (ohm) :

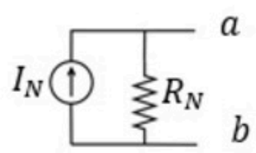
3 ✓

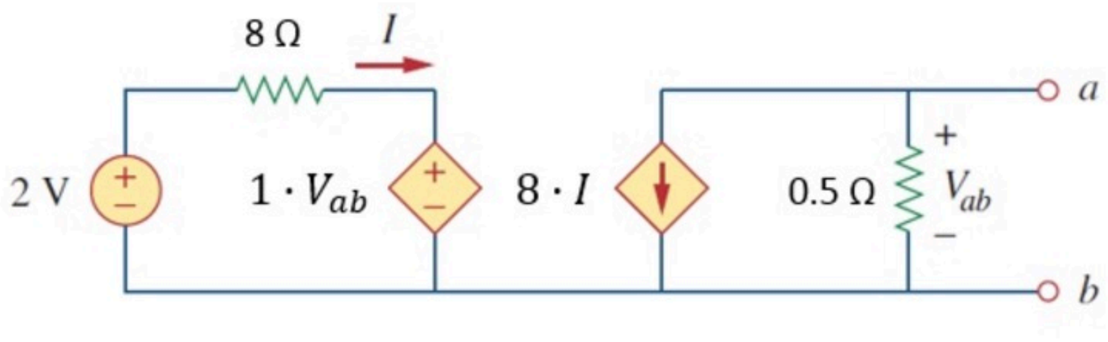
Hint: Use superposition to find Voc.

PP Circuit theorems 018

Unlimited Attempts.

Find the Norton equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

IN (A) :

-2 ✓

RN (ohm) :

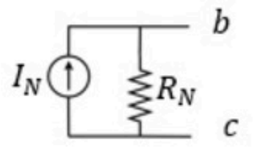
1 ✓

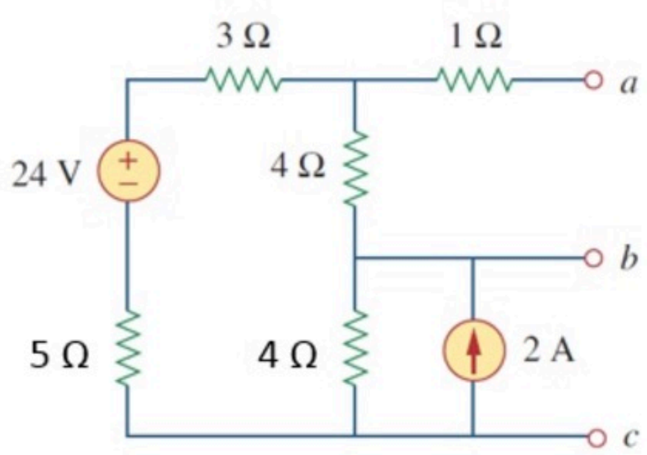
Hint: Find Isc and Voc

PP Circuit theorems 019

Unlimited Attempts.

Find the Norton equivalent model of this circuit, as seen between b and c.





Given Variables:

. : . .

Calculate the following:

IN (A) :

4 ✓

RN (ohm) :

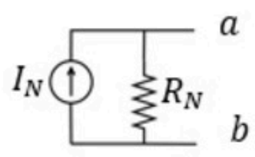
3 ✓

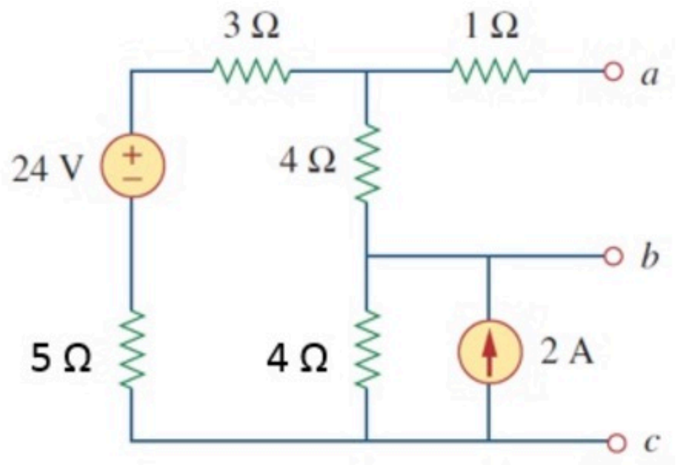
Hint: Does the 1 ohm resistor impact your calculations?

PP Circuit theorems 020

Unlimited Attempts.

Find the Norton equivalent model of this circuit, as seen between a and b. [Hint: if you have difficult numbers, try to use different tests]





Given Variables:

. : . .

Calculate the following:

IN (A) :

1 ✓

RN (ohm) :

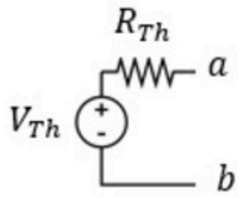
4 ✓

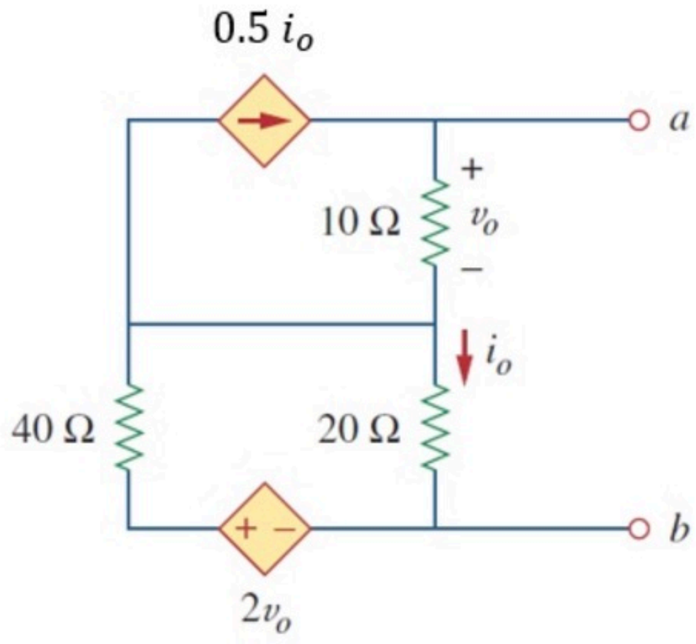
> Hint: Can you plug in the 1 ohm resistor afterwards?

PP Circuit theorems 021

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

0 ✓

Rth (ohm) :

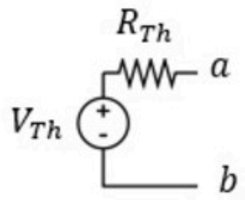
40 ✓

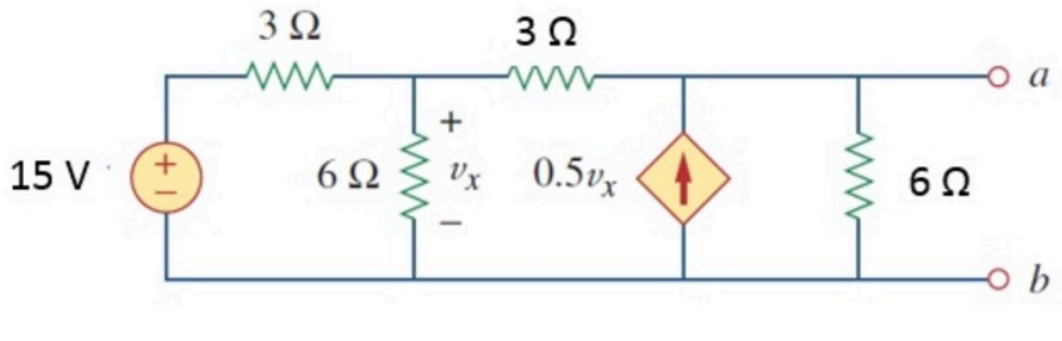
Hint: Use a test source to find Rth.

PP Circuit theorems 022

Unlimited Attempts.

Find the Thevenin equivalent model of this circuit, as seen between a and b.





Given Variables:

. : . .

Calculate the following:

Vth (V) :

30 ✓

Rth (ohm) :

6 ✓

Hint: Find Isc and Voc.