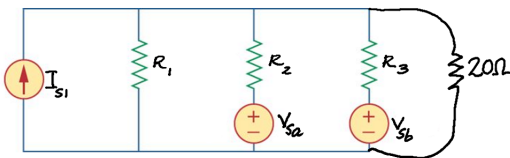


1. (17 points)

In the figure, the values of the resistors are as follows: $R_1 = 36 \Omega$, $R_2 = 19 \Omega$, $R_3 = 32 \Omega$, $V_{sa} = 59 \text{ V}$, $V_{sb} = 12 \text{ V}$, $I_s = 7 \text{ A}$. Using sources transformations only, reduce all the circuit around the 20Ω resistor on the far right to a voltage source in series with a resistor. What are the values of that voltage source and of that resistor?

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

Sources Transformation Exercise



Voltage source = ____ V

Resistor = ____ Ω

Correct Answers:

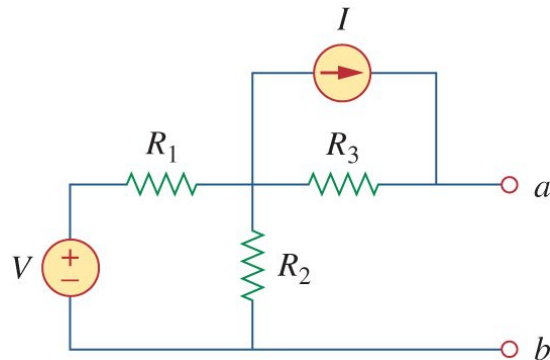
- 93.8592
- 8.95581

2. (17 points)

In the figure, the values of the resistors are as follows: $R_1 = 14 \Omega$, $R_2 = 37 \Omega$, $R_3 = 27 \Omega$, $V = 42 \text{ V}$, $I = 5 \text{ A}$. What is the voltage drop from node (a) to node (b)? Now, if you join nodes (a) and (b) with a wire, what is the current flowing through that wire from top to bottom?

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

Open Circuit and Short Circuit of a simple configuration



Voltage of (a) with respect to (b) = ____ V

Current = ____ A

Correct Answers:

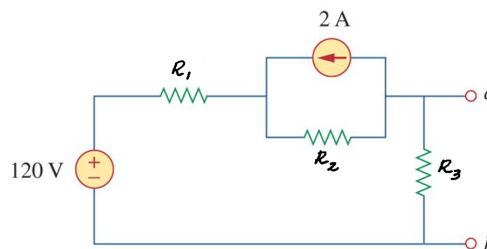
- 165.471
- 4.4533

3. (17 points)

In the figure, the values of the resistors are as follows: $R_1 = 39 \Omega$, $R_2 = 15 \Omega$, $R_3 = 30 \Omega$. If we apply a 1 A current source from node (b) to node (a), what is the voltage that appears on that source, V_{1A} ? If we replace that current source by one of 2 A , what is the voltage in the new current source, V_{2A} ?

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

1A/2A test circuit scenario



Test 1A: $V_{1A} =$ ____ V

Test 2A: $V_{2A} =$ ____ V

Correct Answers:

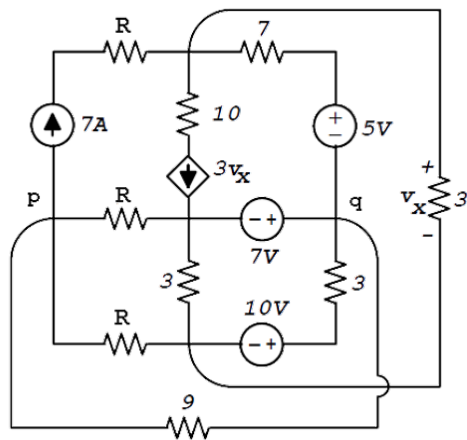
- 51.4286

4. (17 points)

In the figure, the values of the resistor $R = 27 \Omega$. If you substitute the nine ohm resistor at the bottom of the figure by a current source pointing to the left, what is the voltage that appears in that source (enter how much higher the “tip” is than the “tail” in the new current source). (a) Compute this first for a 1 A current source, and then (b) for a 2 A current source.

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

1A/2A test circuit scenario



Test 1A: $V_{1A} = ___ V$

Test 2A: $V_{2A} = ___ V$

Correct Answers:

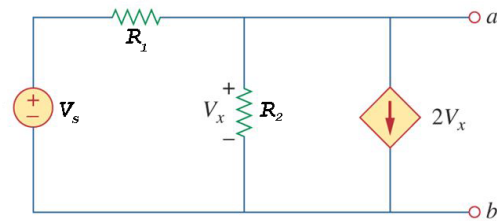
- -90.2639
- -76.4062

5. (16 points)

In the figure, the values of the voltage source is 12 volts, and the values of the resistors are $R_1 = 39 \Omega$, $R_2 = 13 \Omega$. What in the voltage V_{ab} , and, if you join nodes (a) and (b) with a wire, what is the current that flows top to bottom through that wire?

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

A simple OC SC scenario



Test 1A: $V_{ab} = ___ V$

Test 2A: $I_{sc} = ___ A$

Correct Answers:

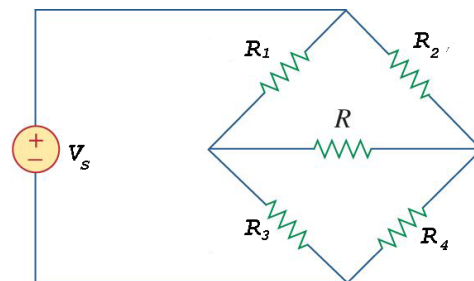
- 0.146341
- 0.307692

6. (16 points)

In the figure, the values of the resistors are $R_1 = 35 \Omega$, $R_2 = 7 \Omega$, $R_3 = 34 \Omega$, $R_4 = 11 \Omega$. If you replace the voltage source by a wire, you also replace the resistor R in the middle by an ohmmeter, what is the reading, in ohms, of the ohmmeter?

Note: In this problem, you may only submit numerical answers. (i.e. If 4 is the correct answer, 4 will be marked as correct, but 2+2 will be marked as incorrect.)

A bridge circuit.



Equivalent resistance: $R = ___ \Omega$

Correct Answers:

- 21.5242