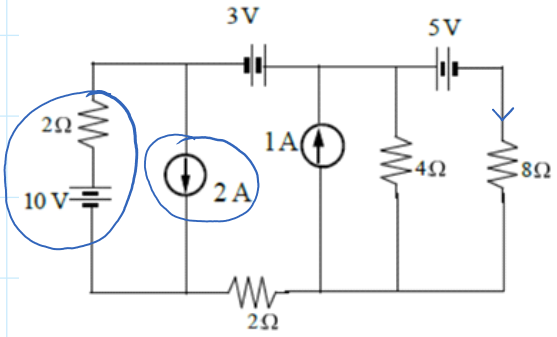
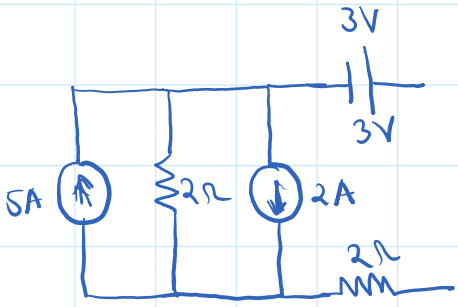
Exercise1

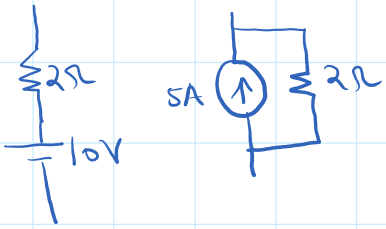
Saturday, November 13, 2021 12:32 PM

Find the current through 8Ω resistor by source transformation method, in the circuit shown below



1)





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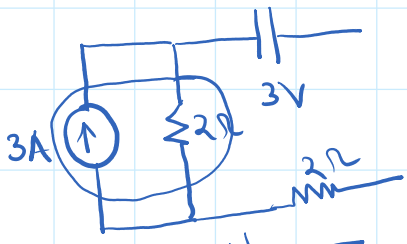
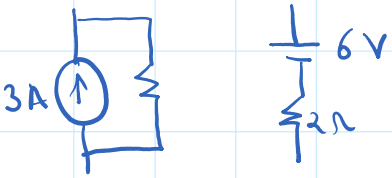
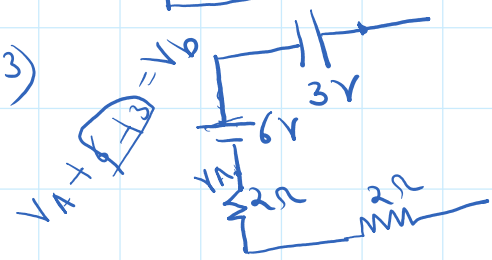
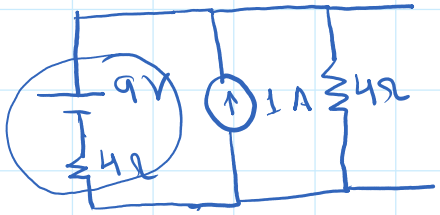


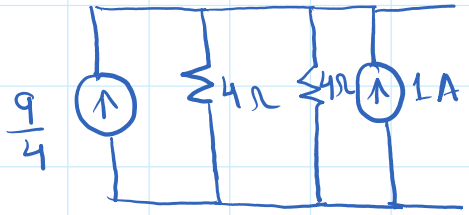


3)

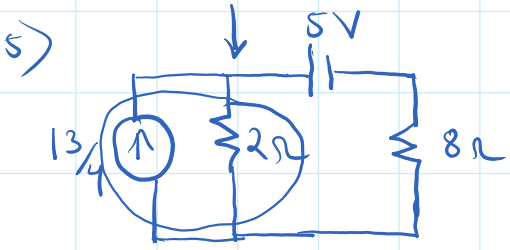


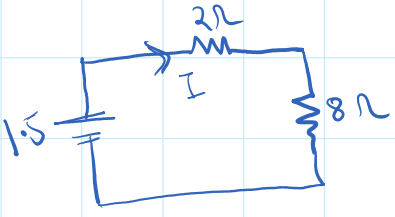
4)





5)



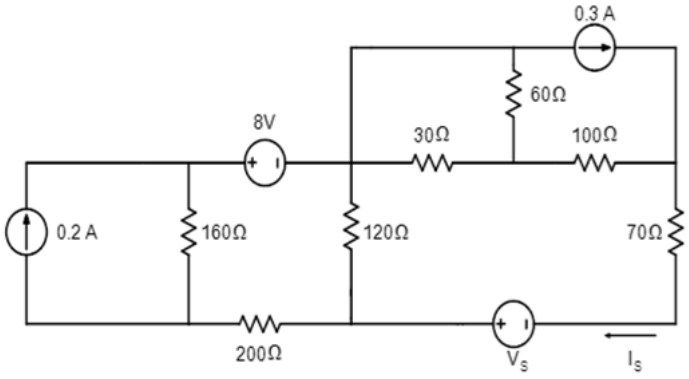


$$I = \frac{1.5}{10} = 0.15\,A$$

Homework

Saturday, November 13, 2021 12:34 PM

In the circuit shown, compute the value of V_S to deliver a current of I_S = 0.25 A using source transformation



Exercise2

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Determine the resistance between A and B in the network shown below

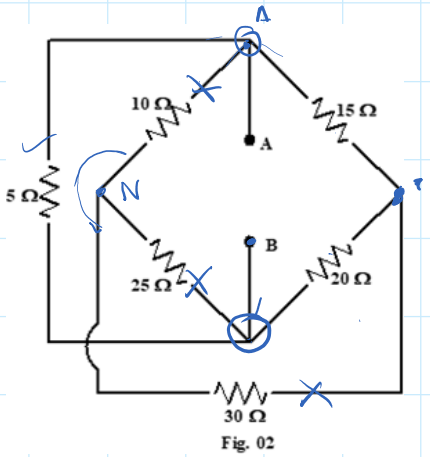
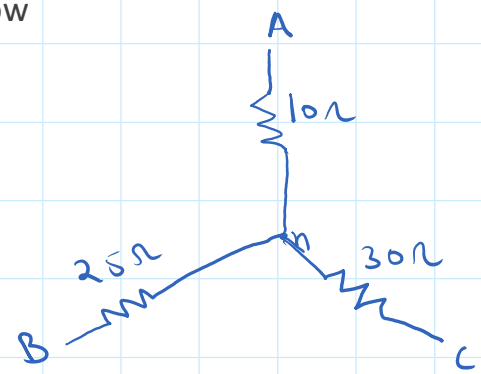


Fig. 02

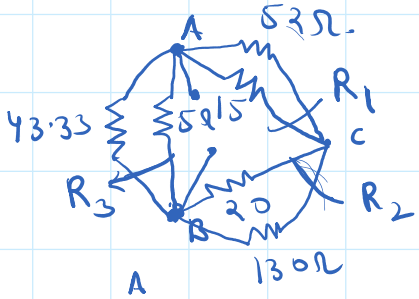


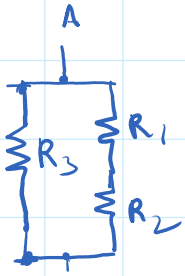
$$R_{AB} = R_A + R_B + \frac{R_A R_B}{R_C}$$

$$= 10 + 25 + \frac{10 \times 25}{30} = 43.33$$

$$R_{BC} = 25 + 30 + \frac{30 \times 25}{10} = 130$$

$$R_{CA} = 30 + 10 + \frac{30 \times 10}{25} = 52$$



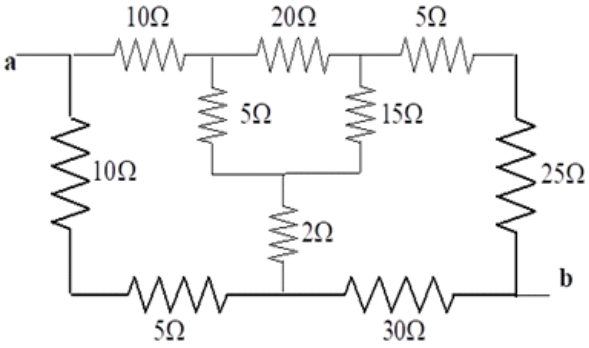


$$R_{AB} = B\frac{(R_1 + R_2)R_3}{R_1 + R_2 + R_3}$$

Homework

Saturday, November 13, 2021 12:38 PM

Determine the resistance between terminals a & b of the network shown in figure, using Star-Delta transformation.

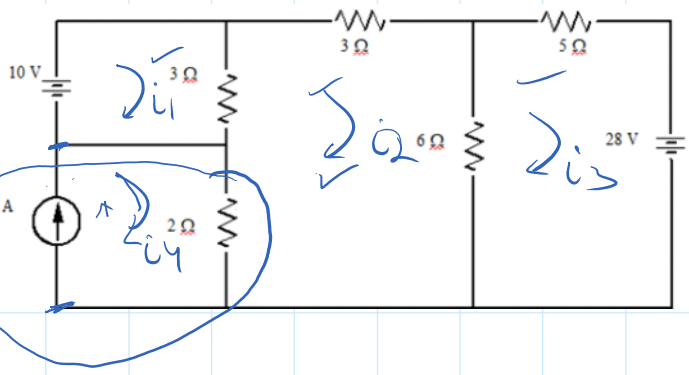


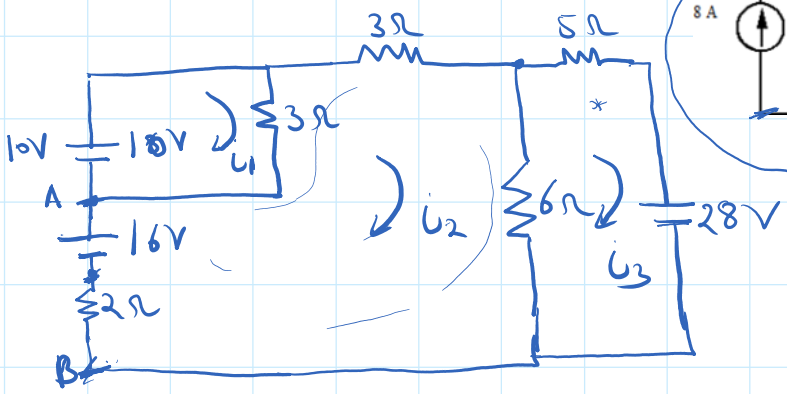
Exercise3

Saturday, November 13, 2021 12:39 PM

- Find the voltage across the current source using mesh current analysis.

$i_4 = 8\ A$





$V_A - 16 + 2i_2 = V_B$

$V_A - V_B = 16 - 2i_2$

$= 16 - 2(1.38)$

$= 13.24\ V$

$10 - 3(i_1 - i_2) = 0$

$+3i_1 - 3i_2 = 10$ — (1)

$16 - 3(i_2 - i_1) - 3i_2 - 6(i_2 - i_3) - 2i_2 = 0$

$-3i_1 + 14i_2 - 6i_3 = 16$ — (2)

$+5i_3 + 28 + 6(i_3 - i_2) = 0$ — (3)

$-6i_2 + 11i_3 = -28$ — (3)

$i_1 = 4.72\ A$

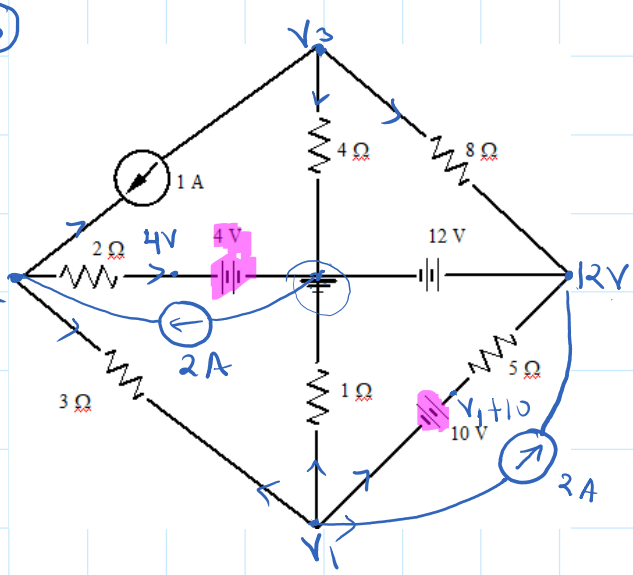
$i_2 = 1.38\ A$

$i_3 = -1.78\ A$

Exercise4

Saturday, November 13, 2021 12:39 PM

Find the voltage of all nodes using node voltage analysis



$$\frac{V_1-V_2}{3}+\frac{V_1-0}{1}+\frac{V_1-12}{5}+2=0 \quad (1)$$

$$\frac{V_2-V_1}{3}-2+\frac{V_2-0}{2}-1=0$$

$$\frac{V_3-12}{8}+\frac{V_3-0}{4}+1=0$$

$$V_1\left[\frac{1}{3}+1+\frac{1}{5}\right]-\frac{V_2}{3}=\frac{12}{5}-2$$

$$=\frac{2}{5}$$

$V_1=\frac{8}{7}$

$V_1=1.14$ V

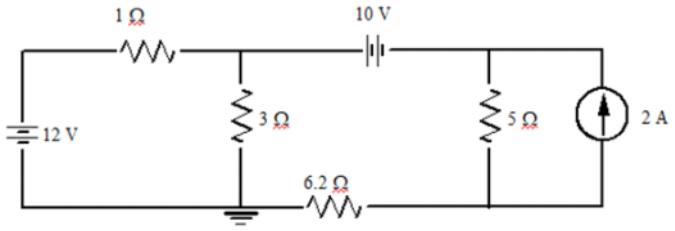
$V_2=4.05$ V

$V_3=1.33$ V

Homework

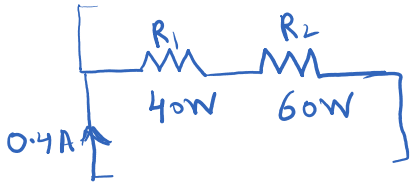
Saturday, November 13, 2021 12:40 PM

Find the node voltages and also current through 1 ohm



Exercise5

Saturday, November 13, 2021 12:42 PM



Two incandescent bulbs of 40 W and 60 W ratings are connected in series across the mains. Then which of the following statement(s) is(are) correct?

a) The bulbs together will consume 100 W ✗ ✓
b) The bulbs together will consume 50 W ✗ ✓
c) The 60 W bulb glows brighter ✗
d) The 40 W bulb glows brighter ✓

Assume the voltage rating of both the bulbs to be same = 100 V (V)

$40 = 100 \times I_{1\,Rating}$

$I_{1rating} = 0.4\,A$

$I_{2rating} = \frac{60}{100} = 0.6\,A$

$P_1 = I_1^2 R_1$

$40 = (0.4)^2 R_1$

$R_1 = 250\,\Omega$

$P_2 = I_2^2 R_2$

$60 = (0.6)^2 \times R_2$

$R_2 = 166.66$

$R_2 = 166.66$

$R_1 = 250$

$I_{max} = 0.4\,A$

$P_{40} = (0.4)^2 \times 250 = 40\,W$

$P_{60} = (0.4)^2 \times 166.6 = 26.65\,W$

$= 40$
26.65
66.65