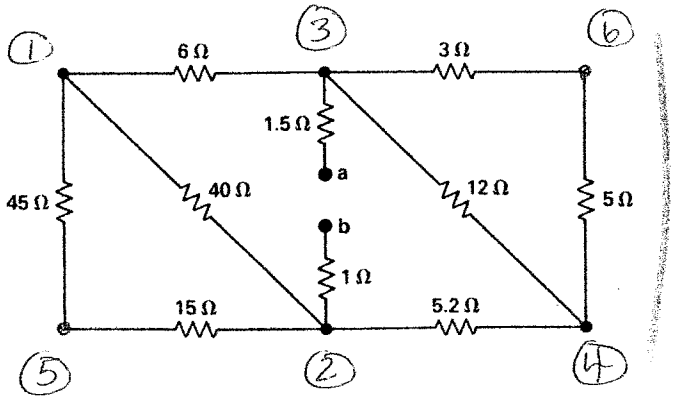
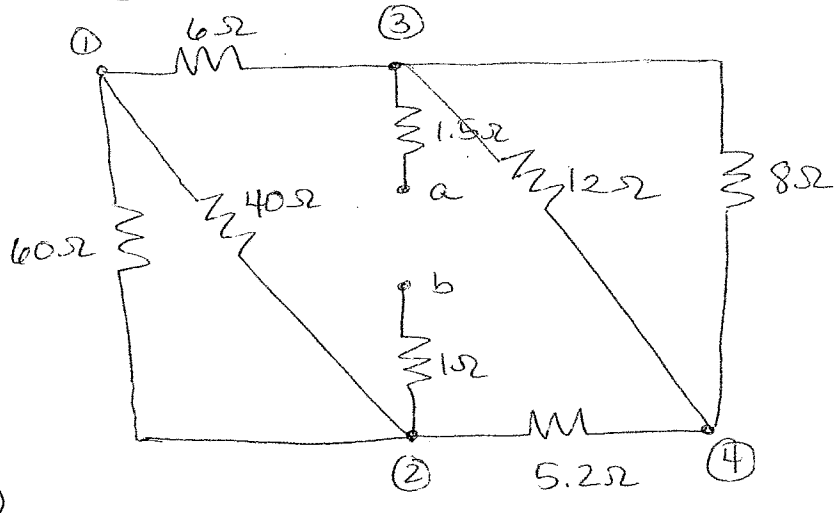
Find the equivalent resistance, Rab at nodes a & b.



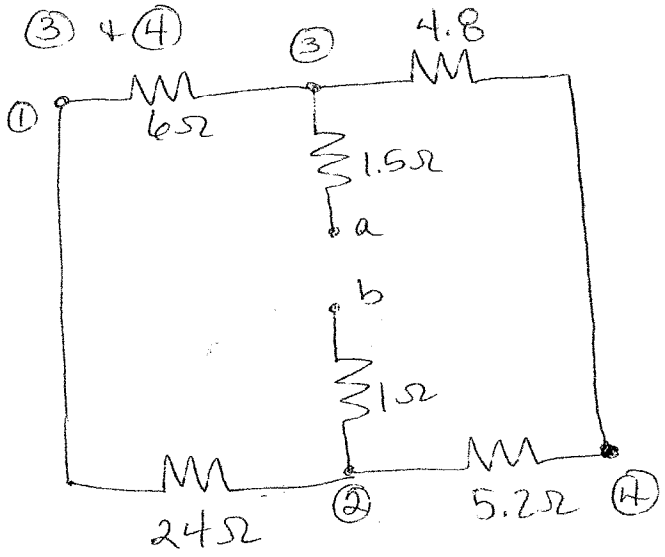
3 & 5 are in series, lose ⑥ $R_{eq} = 8\Omega$

45 & 15 are in series, lose ⑤ $R_{eq} = 60\Omega$



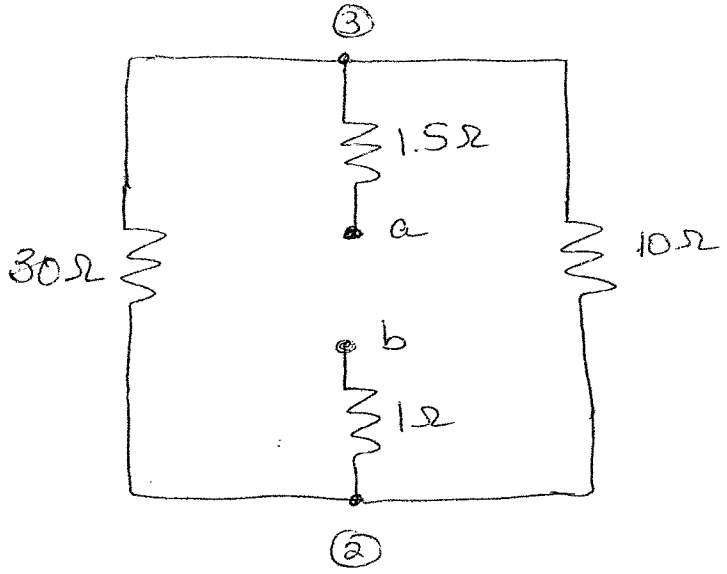
$60 \| 40$ (24) at ① & ②

$8 \| 12$ (4.8Ω) at ③ & ④

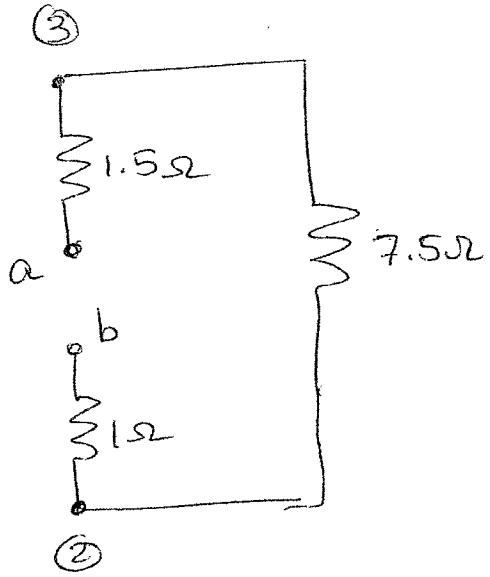


4.8 & 5.2 in series = 10Ω (lose ④)

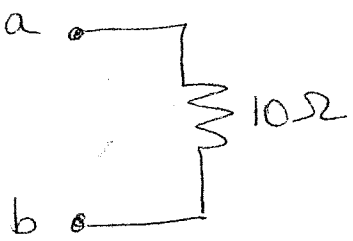
6 & 24 in series = 30Ω (lose ①)



30||10 @ ③ & ②

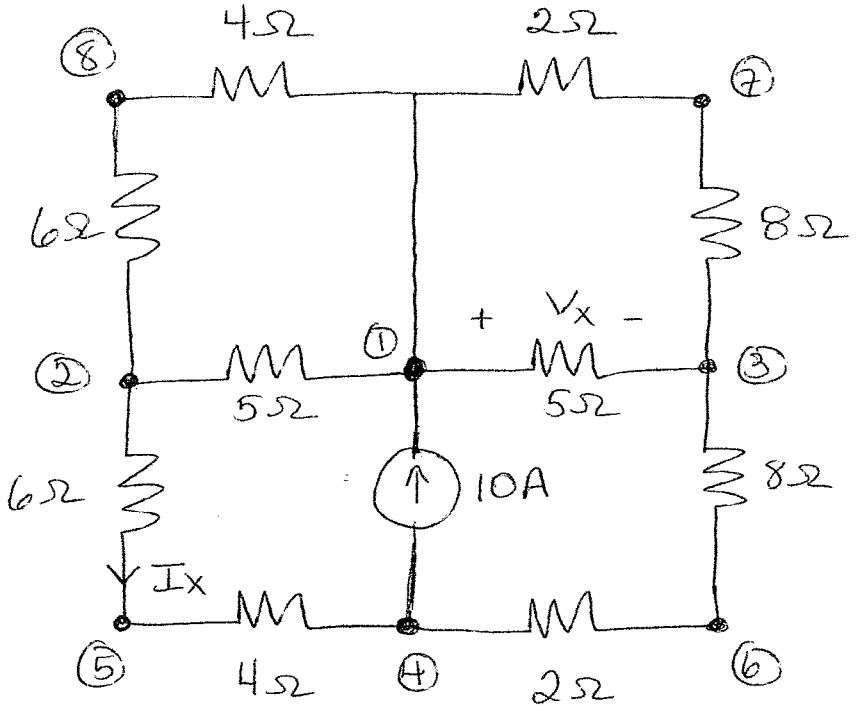


7.5, 1.5, & 1 in series = 10Ω (lose ③ & ②)



Extra Problem

Simplification & Expansion

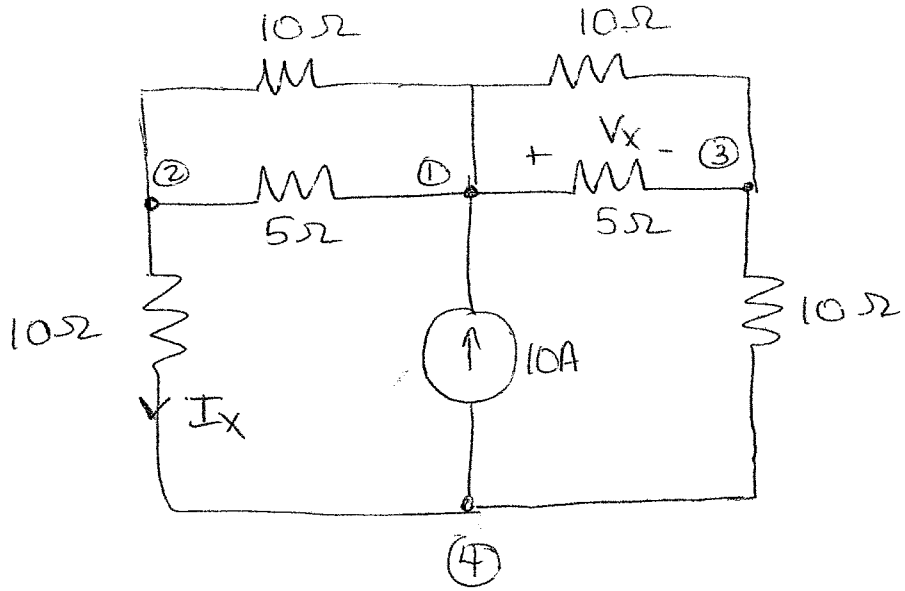


Find V_x & I_x

(note how much is connected @ ①)

Step 1 4Ω & 6Ω (10Ω) on the top & bottom are in series (lose ⑧ & ⑦)

2Ω & 8Ω on the top & bottom are in series (lose ⑤ & ⑥) to 10Ω



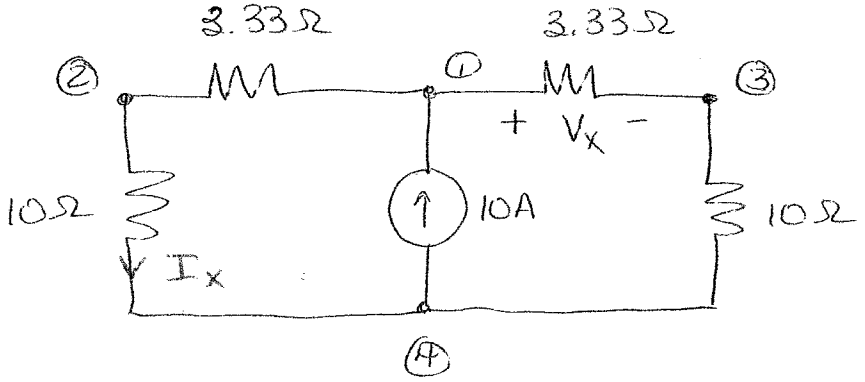
I_x still on ckt

V_x still on ckt.

Simp. & Expansion example - cont

Step 2 on both right & left ① & ② and ① & ③

5 || 10 = 3.33 Ω



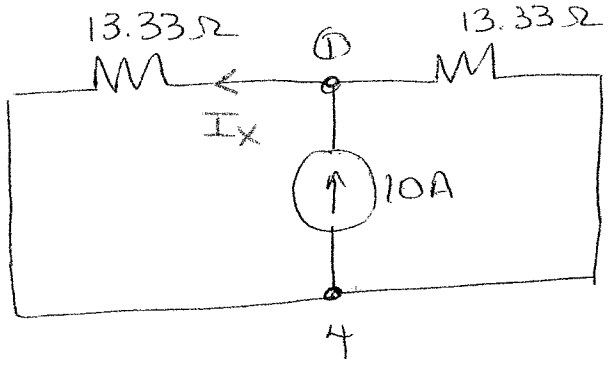
I_x still on ckt

V_x still on ckt.

Step 3

on each side 3.33 & 10 are in series

lose ② & ③

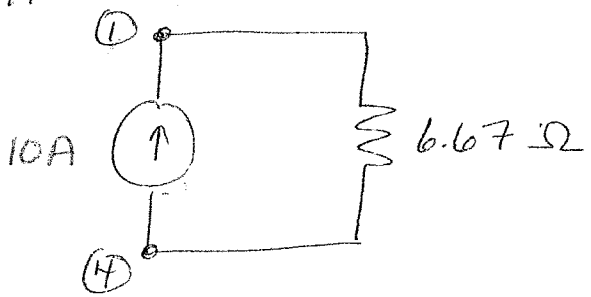


I_x still on ckt.

V_x not on ckt

Step 4

13.33 // 13.33 at ① & ④



I_x not on the ckt.

Simplification & Expansion

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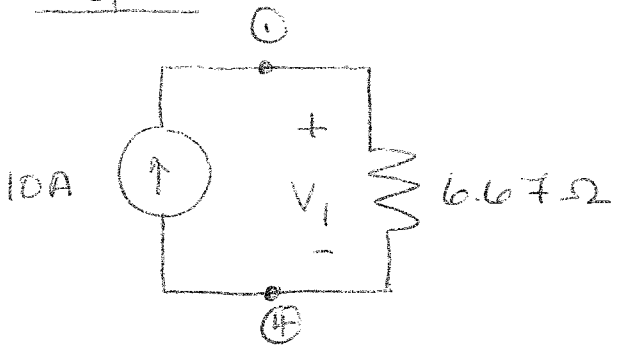
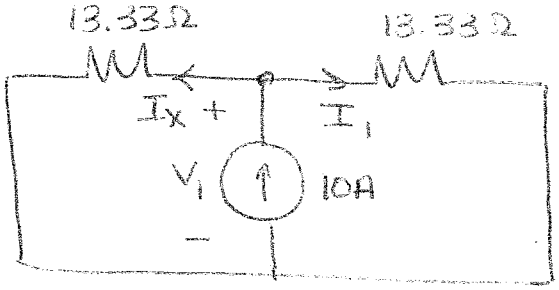
Step 5



$V_1 = 10(6.67)$

$V_1 = 66.67V$

Step 6 (using ckt from step 3)

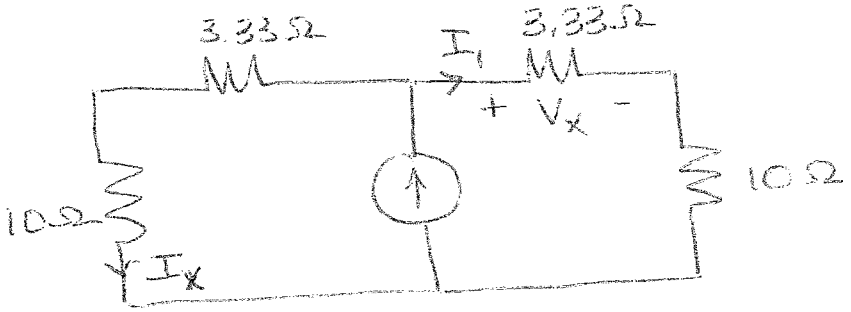


V_1 is the voltage from ① to ④

So $I_x = \frac{V_1}{13.33} = 5A$

and $I_1 = \frac{V_1}{13.33} = 5A$

Step 7 (using ckt from step 2)

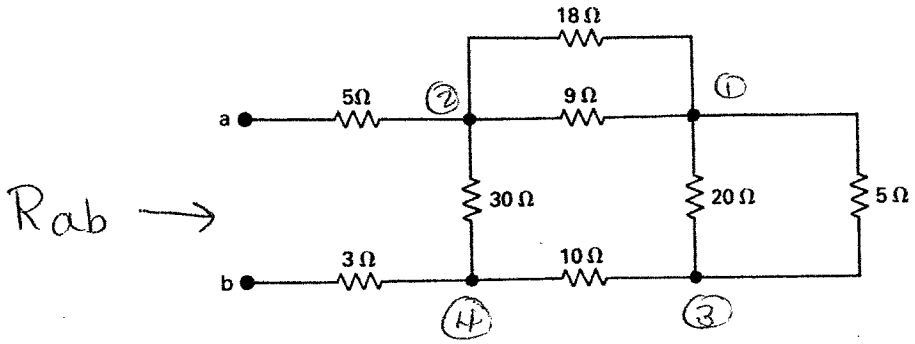


$V_x = I_1(3.33)$

$= 16.65V$

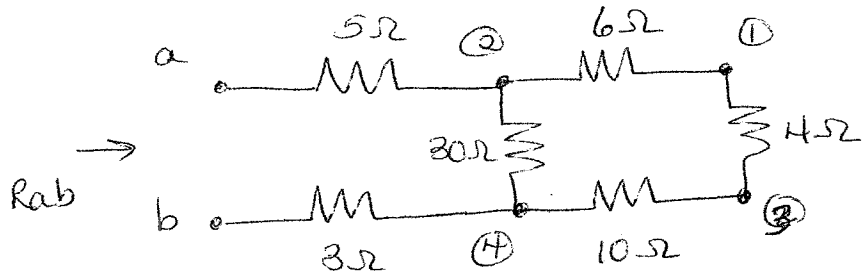
EE 2.13

Find equivalent resistor, Rab



at ① & ② $18 // 9 = 6\,\Omega$

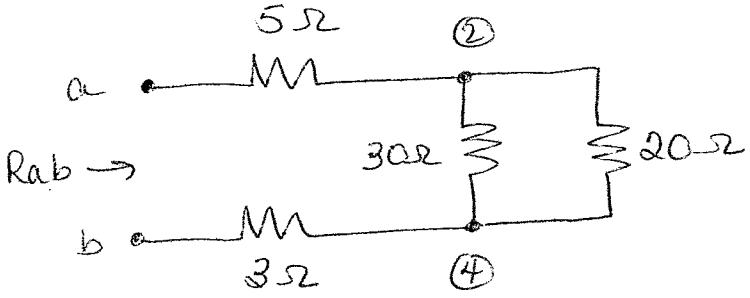
at ① & ③ $20 // 5 = 4\,\Omega$



6Ω, 4Ω, & 10Ω are now in series

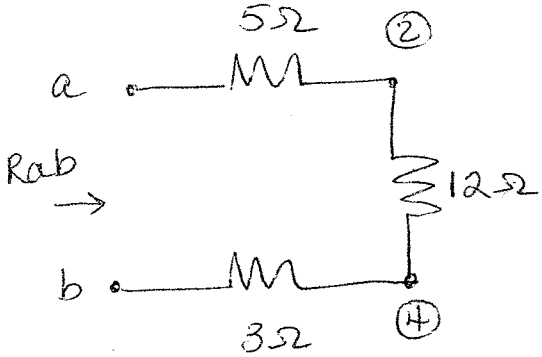
$6 + 4 + 10 = 20\,\Omega$

(Label ① & ③)



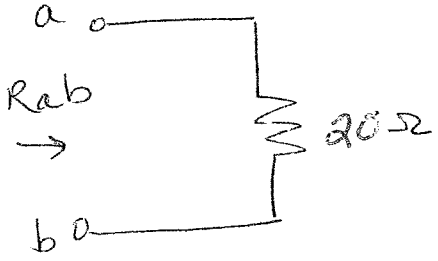
$20 // 30$ @ ② & ④

$20 // 30 = 12\,\Omega$



5, 12 & 3 are in series (label ② & ④)

$5 + 12 + 3 = 20\,\Omega$



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Find equivalent resistor, Rab

$R_{ab} = 15\Omega$

Rab →