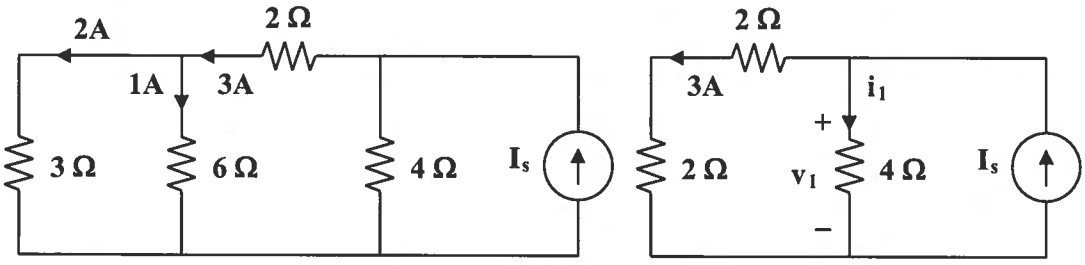
Chapter 4, Solution 4.

If $I_o = 1$, the voltage across the 6Ω resistor is 6V so that the current through the 3Ω resistor is 2A.



(a) (b)

$3\|6 = 2\Omega$, $v_o = 3(4) = 12V$, $i_1 = \frac{v_o}{4} = 3A$.

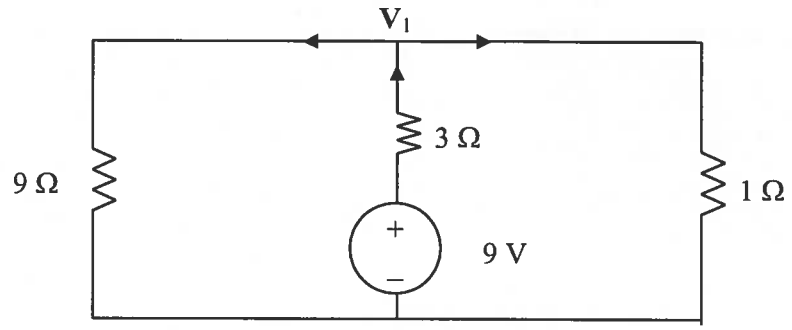
Hence $I_s = 3 + 3 = 6A$

If $I_s = 6A \longrightarrow I_o = 1$

$I_s = 9A \longrightarrow I_o = 9/6 = \mathbf{1.5A}$

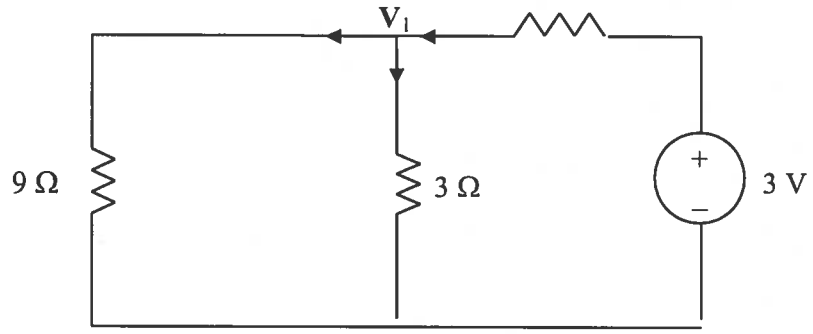
Chapter 4, Solution 8.

Let $V_o = V_1 + V_2$, where V_1 and V_2 are due to 9-V and 3-V sources respectively. To find V_1, consider the circuit below.



$$\frac{9-V_1}{3} = \frac{V_1}{9} + \frac{V_1}{1} \longrightarrow V_1 = 27/13 = 2.0769$$

To find V_2, consider the circuit below.

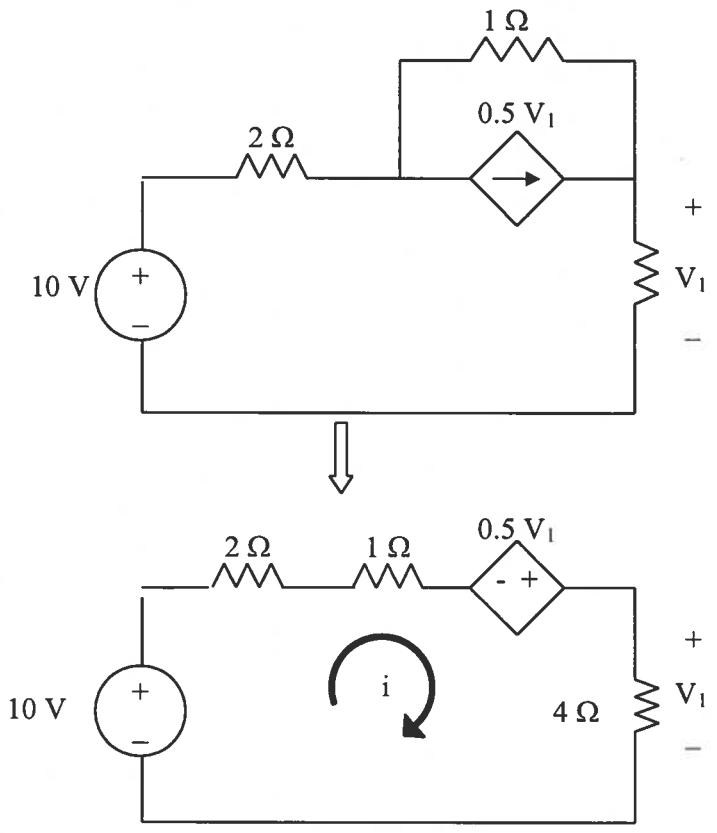


$$\frac{V_2}{9} + \frac{V_2}{3} = \frac{3-V_2}{1} \longrightarrow V_2 = 27/13 = 2.0769$$

$$V_o = V_1 + V_2 = \mathbf{4.1538\ V}$$

Chapter 4, Solution 18.

Let $V_o = V_1 + V_2$, where V_1 and V_2 are due to 10-V and 2-A sources respectively. To find V_1, we use the circuit below.

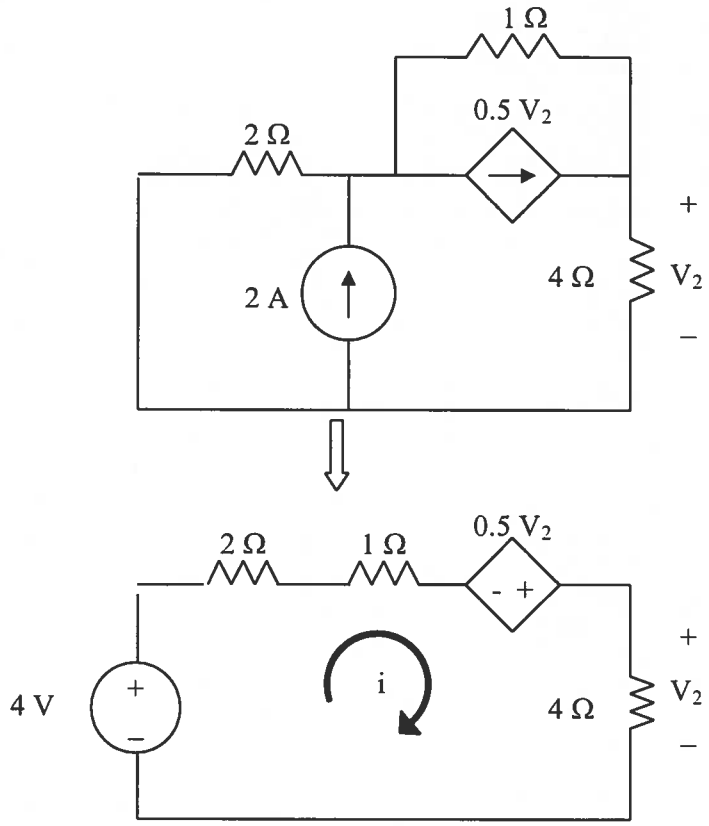


$$-10 + 7i - 0.5V_1 = 0$$

But $V_1 = 4i$

$$10 = 7i - 2i = 5i \longrightarrow i = 2, \quad V_1 = 8\ \text{V}$$

To find V_2, we use the circuit below.



$-4 + 7i - 0.5V_2 = 0$

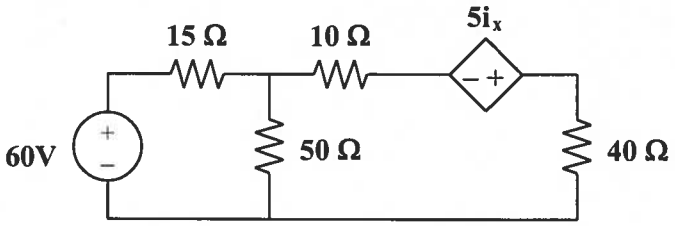
But $V_2 = 4i$

$4 = 7i - 2i = 5i \longrightarrow i = 0.8, \quad V_2 = 4i = 3.2$

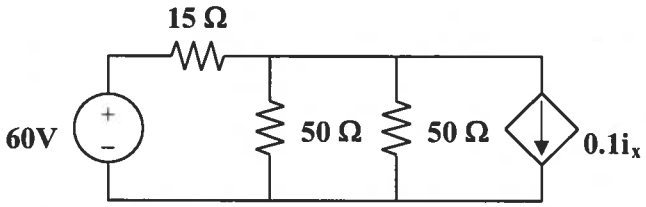
$V_o = V_1 + V_2 = 8 + 3.2 = \mathbf{11.2\ V}$

Chapter 4, Solution 32.

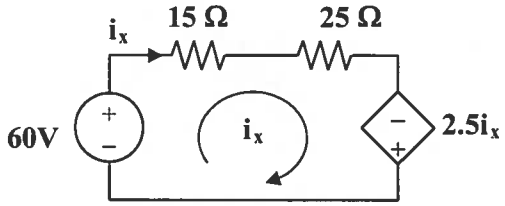
As shown in Fig. (a), we transform the dependent current source to a voltage source,



(a)



(b)



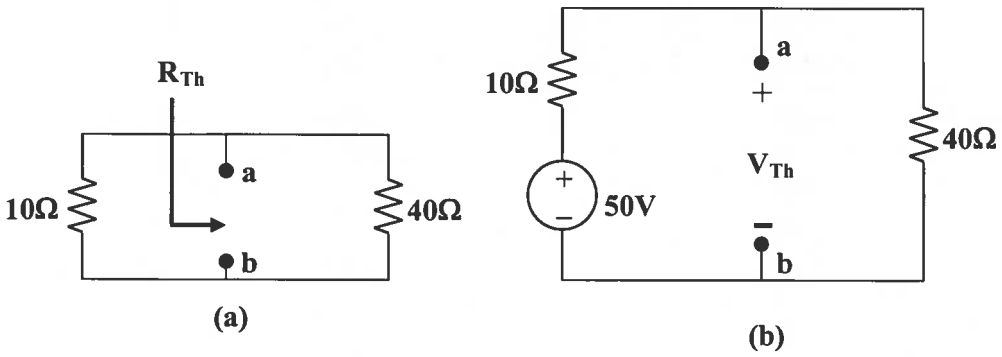
(c)

In Fig. (b), $50||50 = 25$ ohms. Applying KVL in Fig. (c),

$-60 + 40i_x - 2.5i_x = 0$, or $i_x = \mathbf{1.6\ A}$

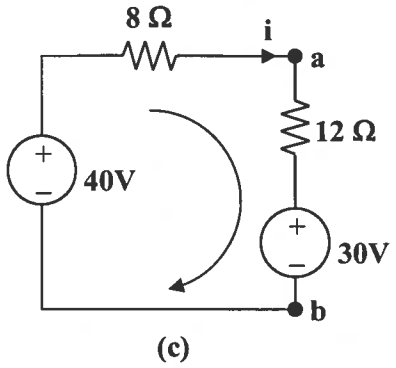
Chapter 4, Solution 36.

Remove the 30-V voltage source and the 20-ohm resistor.



From Fig. (a), $R_{Th} = 10||40 = 8$ ohms

From Fig. (b), $V_{Th} = (40/(10 + 40))50 = 40V$



The equivalent circuit of the original circuit is shown in Fig. (c). Applying KVL,

$$30 - 40 + (8 + 12)i = 0, \text{ which leads to } i = \mathbf{500mA}$$