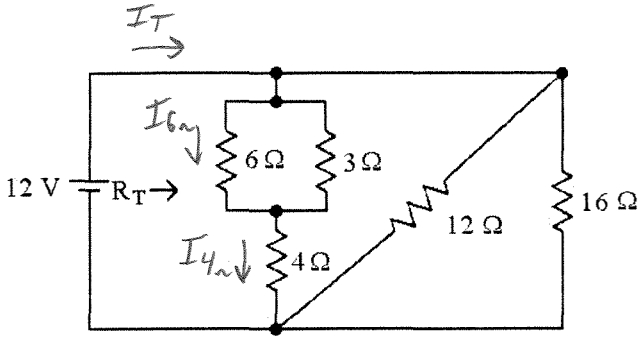


Figure 7.1

1. See Figure 7.1; what is the total resistance R_T as "seen" by the voltage source?

   a. 2.4 ohms
   b. 3.2 ohms
   c. 4.8 ohms
   d. 6.4 ohms

$R_T = 16 // 12 // [6 // 3 + 4]$

$= 6.86 // [2 + 4] = \boxed{3.2\Omega}$

2. See Figure 7.1. What is the current through the 6 ohm resistor?

   a. 0.67 A
   b. 3.00 A
   c. 2.00 A
   d. 1.33 A

$I_T = \frac{12V}{R_T} = \frac{12V}{3.2\Omega} = 3.75A$

$I_{4\Omega} = \frac{12V}{6\Omega} = 2A$

$I_{6\Omega} = 2A \left(\frac{2\Omega}{6\Omega}\right) = \boxed{0.66A}$

(I_T; R_T; R_x)

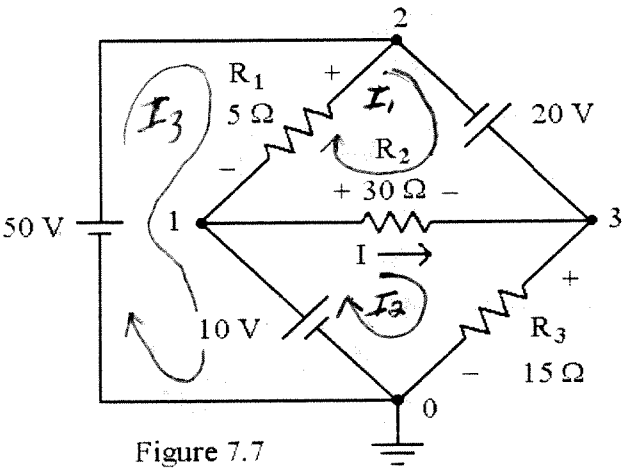


Figure 7.7

3. See Figure 7.7; Find the MESH currents (as assigned above):

a. I_1 = 14.67 A, I_2 = 6.67 A, I_3 = 4.67 A
(b.) I_1 = 6.67 A, I_2 = 4.67 A, I_3 = 14.67 A
c. I_1 = 4.67 A, I_2 = 14.67 A, I_3 = 6.67 A
d. I_1 = 6.67 A, I_2 =14.67 A, I_3 = 4.67 A

① $(I_3 - I_1)R_1 + 20 + (I_2 - I_1)R_2 = 0 \Rightarrow -35I_1 + 30I_2 + 5I_3 = -20$ (1)

② $10 + (I_1 - I_2)R_2 - I_2R_3 = 0 \Rightarrow 30I_1 - 45I_2 + 0I_3 = -10$ (2)

③ $50 + (I_1 - I_3)R_1 - 10 = 0 \Rightarrow 5I_1 + 0I_2 - 5I_3 = -40$ (3)

SOLVING YIELDS: $I_1 = 6.67A$, $I_2 = 4.67A$, $I_3 = 14.67A$

4. See Figure 7.7; Determine "I," the current through R_2 (in the direction shown):

(a.) -2.0 A
b. 2.0 A
c. 10.0A
d. -10.0 A

$I_{R_2} = I_2 - I_1 = \boxed{-2A}$

5. See Figure 7.7; Determine the power dissipated by R_1.

a. 327 W
(b.) 320 W
c. 246 W
d. 60.0 W

$P_{R_1} = (I_3 - I_1)^2 R_1 = \boxed{320W}$

6. See Figure 7.7; Determine the current flowing through R3.

(a.) 4.67 A, down
b. 8 A, down
c. 4.67 A, up
d. 6.67 A, down

$I_2 \Rightarrow \boxed{4.67A, DOWN}$

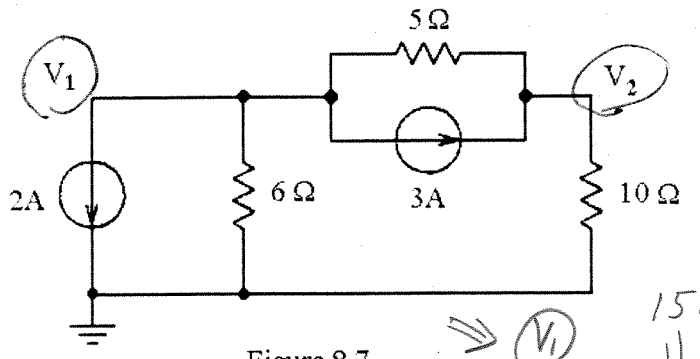
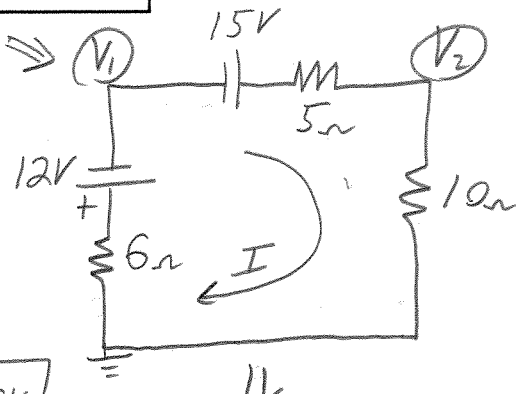


Figure 8.7

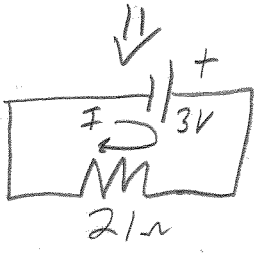
7. See Figure 8.7. Find V_1 and V_2

a. V_1 = -24 V, V_2 = 30 V
b. V_1 = -12.9 V, V_2 = 1.43 V
c. V_1 = -8.01 V, V_2 = 4.66 V
d. V_1 = -1.43 V, V_2 = -17.6 V



KVL: $V_1 = -12V - I(6\Omega) = \boxed{-12.86V}$

KVL: $V_2 = I(10\Omega) = \boxed{1.429V}$



$I = \frac{3V}{21\Omega} = \underline{142.9mA}$

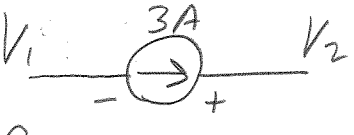
8. See Figure 8.7. Find the current through the 5 ohm resistor:

a. 10.8 A, right to left
b. 0.67 A, left to right
c. 2.86 A right to left
d. 3.23 A, left to right

$$I_{5\Omega} = \frac{V_2 - V_1}{5\Omega} = \frac{14.29V}{5\Omega} = \boxed{2.86A}$$

9. See Figure 8.7. Find the power delivered by the 3A source:

a. 42.9 W
b. 162 W
c. 38.0 W
d. 48.5 W

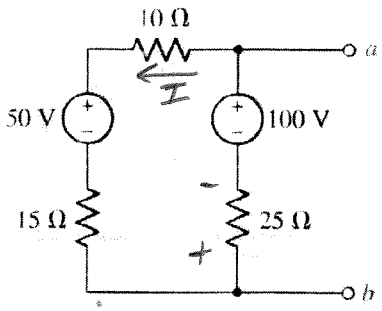


$P_{3A} = I(V_2 - V_1)$

$= 3A(14.29V)$

$\boxed{P_{3A} = 42.87W}$

Figure 5.70



$R_{TH} = (10+15)\,//\,25$

$R_{TH} = 12.5\,\Omega$

$V_{TH} = 100V - 25\Omega(I)$

$I = \frac{100V - 50V}{50\Omega} = 1A$

$\therefore V_{TH} = 100 - 25 = 75V$

10. For Figure 5.70: Find the Thevenin equivalent resistance (R_{TH}) looking back into the circuit from terminals a-b (the load has already been removed):

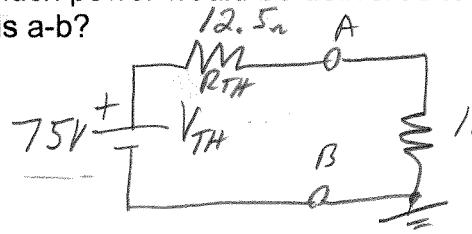
a. 50 ohms
b. 12.5 ohms
c. 25 ohms
d. 0 ohms

11. For Figure 5.70: Find the Thevenin equivalent voltage (V_{TH}) looking back into the circuit from terminals a-b (the load has already been removed):

a. 150 V
b. 37.5 V
c. 75 V
d. 50 V

12. See Figure 5.70. How much power would be delivered to a 12.5-ohm resistor placed between terminals a-b?

a. 113 W
b. 44.4 W
c. 38.5 W
d. 67.9 W



$I = \frac{75V}{25\Omega} = 3A$

$P = I^2 \cdot R$

$= 112.5W$

13. See Figure 5.70. How much power would be delivered to a 100-ohm resistor placed between terminals a-b?

a. 44.4 W
b. 64.2 W
c. 62.1 W
d. 38.5 W

W/100Ω LOAD

$I = \frac{75V}{112.5\Omega} = 666.7mA$

$P = I^2 \cdot R = 44.44W$

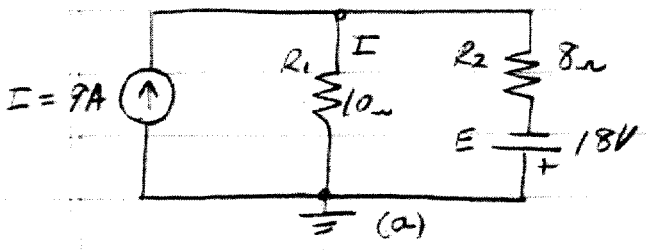


Figure 2 – Circuit for Problems 14 and 15

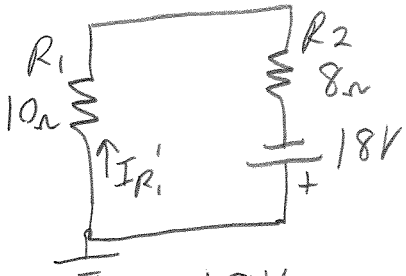
14. See Figure 2 above. Find the current that flows through R_1 due only to the 18V source and the direction of this current:

    a. 4 A, top to bottom
    b. 2.23 A, bottom to top
    c. 5 A, top to bottom
    d. 1 A, bottom to top

15. See Figure 2 above. Find the total current that flows through R_1 and the direction of this current:

    a. 3 A, top to bottom
    b. 2.23 A, bottom to top
    c. 1 A, top to bottom
    d. 6.77 A, top to bottom

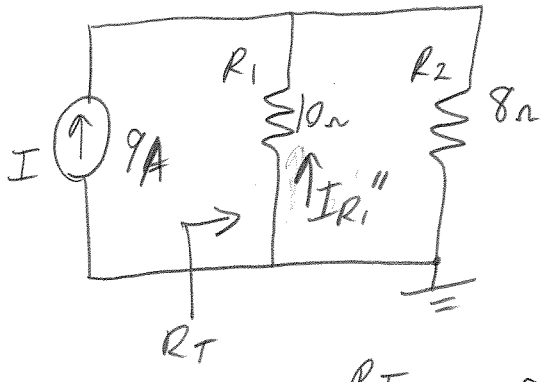
DUE TO 18V



$$I_{R_1}' = \frac{18V}{R_1 + R_2} = \frac{18V}{18\Omega}$$

$$= \boxed{1A}$$

DUE TO I



$$I_{R_1}'' = -I\frac{R_T}{R_1} = 9A\left(\frac{10\Omega \,//\, 8\Omega}{10\Omega}\right)$$

$$= -4A$$

$$\therefore I_{R_1} = 1 - 4 = \boxed{-3A}$$ BOTTOM TO TOP

OR 3A TOP TO BOTTOM