A (앰페어) = Current

1. Assign values to V and I in element B so that it is equivalent to element A (see Figure 1).

V=I·R

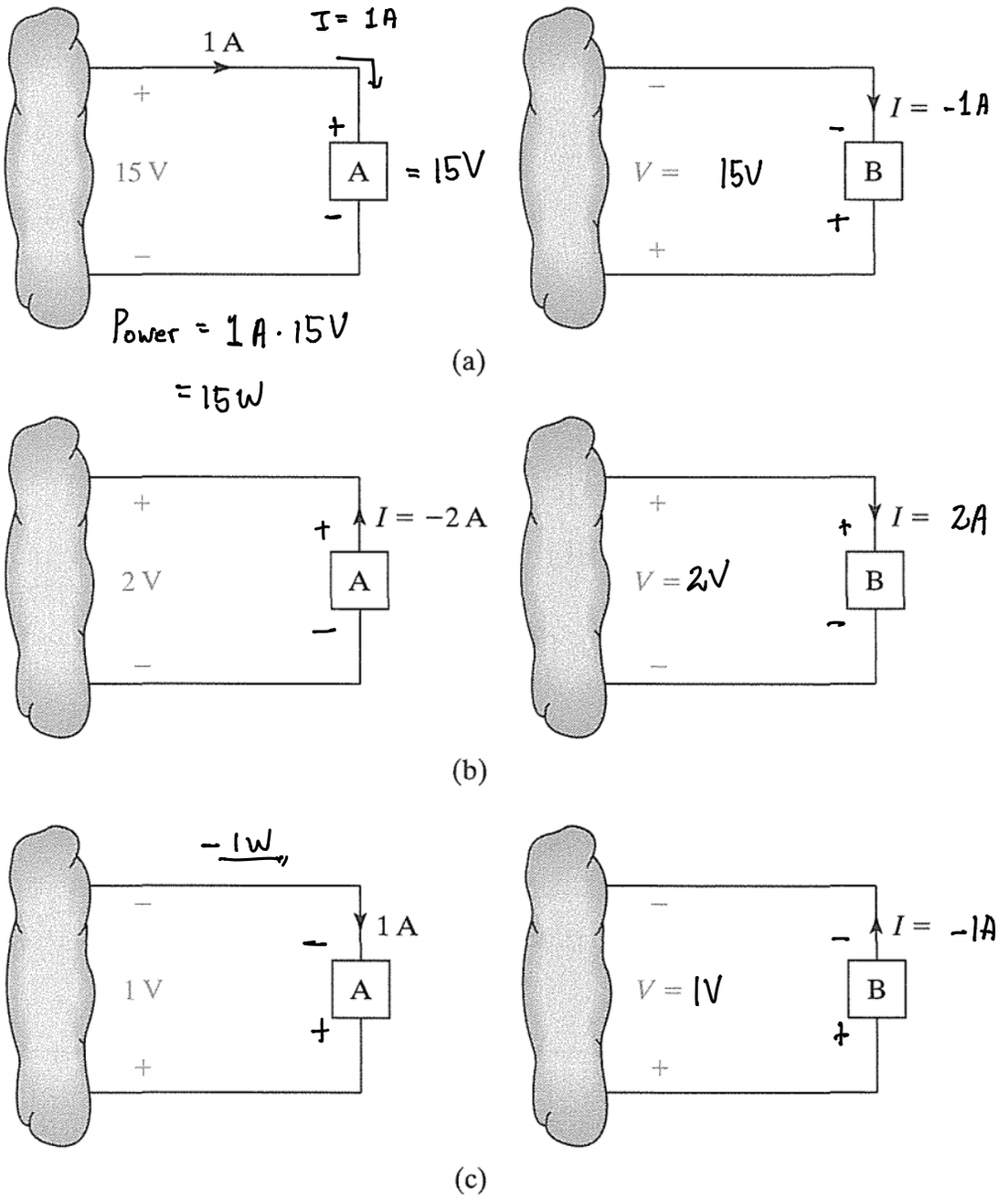


Figure 1

2. Assign directions to currents and polarities to voltages in element B so it is equivalent to element A (see Figure 2)

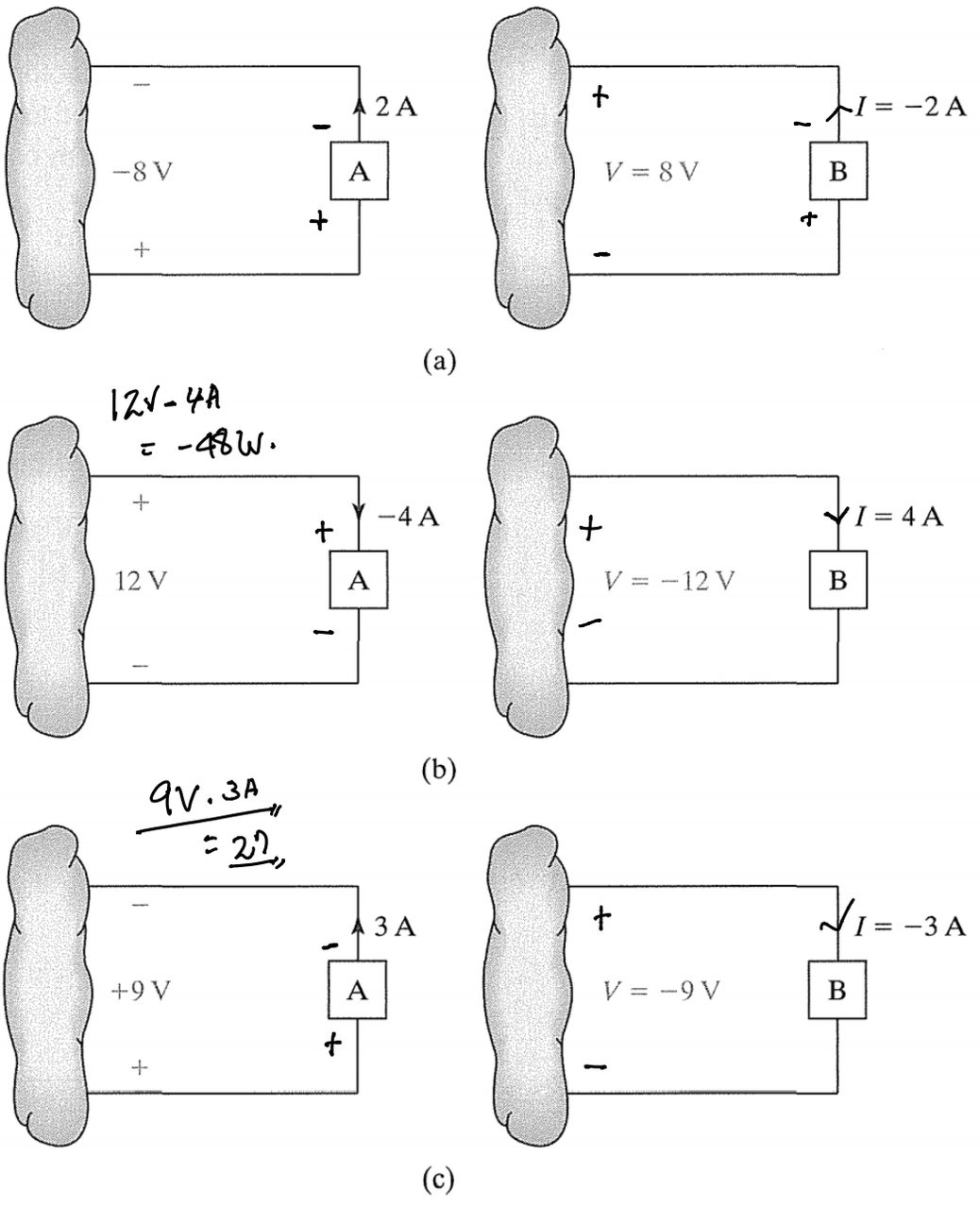


Figure 2

3. In the elements of Figure 3, determine for each if they are supplying power or absorbing power and the magnitude of the power being transferred.

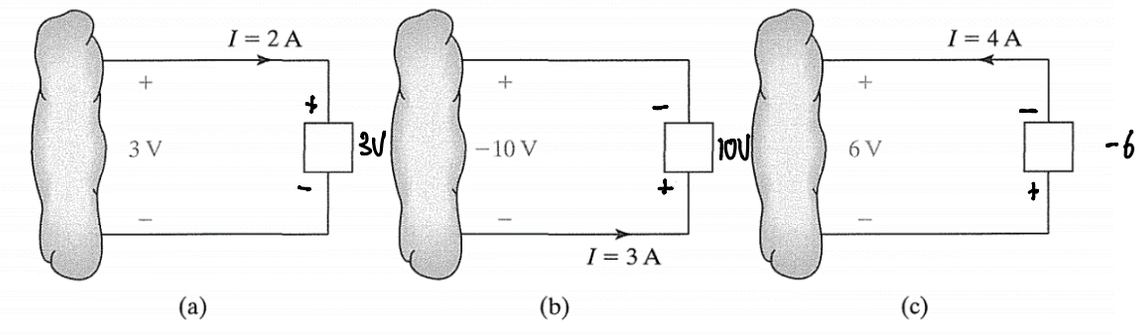


Figure 3

(a) Power = I · V

= 2A · 3V

= 6W

6W > 0 ⇒ Absorbing Power

(b) P = 10V · 3A = 30W

30W > 0 ⇒ Absorbing power

(c) P = -6V · 4A = -24W

-24W < 0 ⇒ Supplying Power

4. In Figure 4 determine for each element whether it is supplying or absorbing power. If all the energy absorbed is dissipated as heat dissipated (in joules) over a period of one hour for each of the circuits shown.

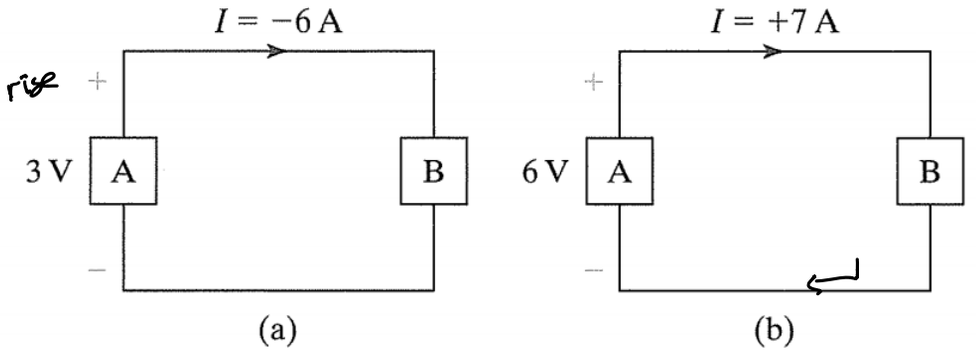


Figure 4

(a) $P_A = 3V \cdot 6A = 18W > 0 \Rightarrow$ Absorbing power

$P_B = 3V \cdot -6A = -18W < 0 \Rightarrow$ Supplying power.

(b) $P_A = 6V \cdot -7A = -42W < 0 \Rightarrow$ Supplying power.

$P_B = 6V \cdot 7A = 42W > 0 \Rightarrow$ Absorbing power

5. A heater element draws 2.0 A when connected to a 120 V source. Calculate both the resistance of the element and the power absorbed in the form of heat.

$$R = \frac{V}{I} = \frac{120}{2.0} = 60\,\Omega$$

$$P = I \cdot V = 2.0 \times 120 = 240\ W$$

6. A speaker is a device that converts electrical energy into sound energy. Assume the internal resistance of a speaker is typically 8Ω. The speaker's power rating is maximum power that can be delivered to it without damage. Therefore, determine the maximum safe current that can be delivered to a stereo speaker with internal resistance of 8Ω and a power rating of 200 watts.

$8\Omega = \frac{V}{A}$ $\quad 200 = I \cdot V$ $\quad \boxed{I = 5A}$

$P = I \cdot V$ $\quad 200 = VA$

$8\Omega \cdot A = V$

$8V \frac{V}{8} = \frac{200}{V}$ $\quad V = 40$

$V^2 = 1600$

7. Find I and V_0 in the network in Figure 5.

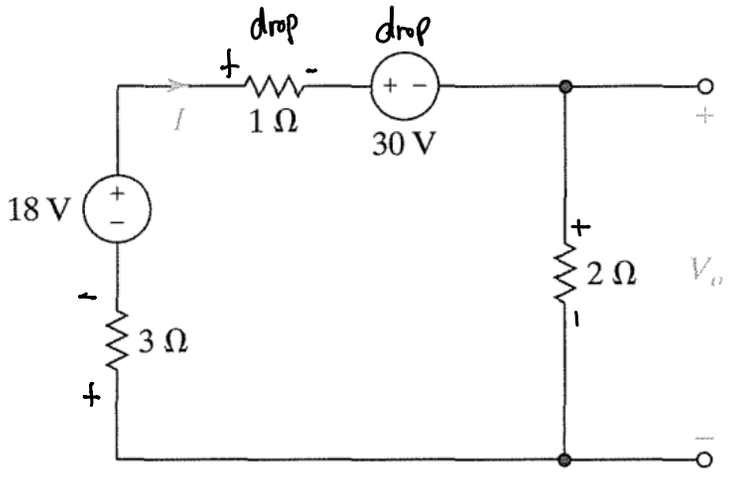


Figure 5

$R_s = 6\,\Omega$

$18 - 30 = I \cdot 1 + 2I + 3I$

$6I = -12$

$I = -2A$

$V_o = -2A \cdot 2 = -4V$

8. Find V, I_1, I_2, and $P_{6\Omega}$ in the network in Figure 6.

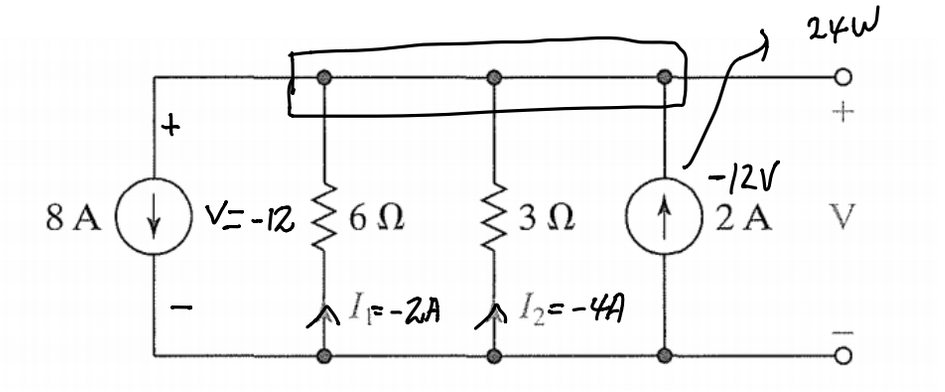


Figure 6

$I = \frac{V}{R}$

$-8 + 2 + (I_1 + I_2) = 0$

$I_1 + I_2 = 6$

$-v(t)\left(-\frac{1}{6} - \frac{1}{3}\right) = 6$

$-\frac{V(t)}{2} = +6 \qquad V(t) = -12$

$I_1 = 2A$

$I_2 = 4A$

$P_{6\Omega} = I \cdot V$

$= -2A \cdot -12 = 2kW$

9. Find the equivalent resistance at the terminals $A - B$ in the network in Figure 7.

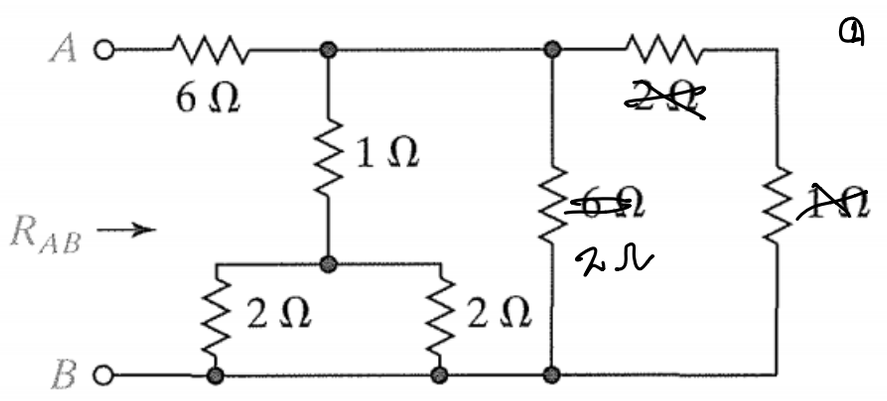
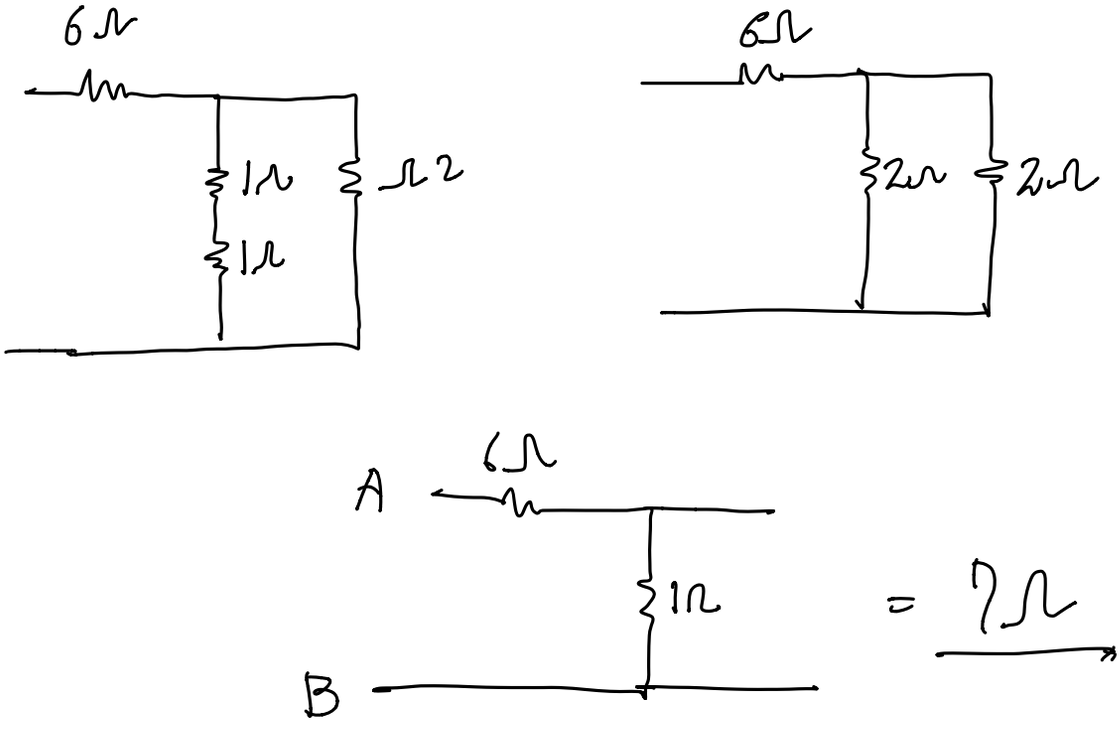


Figure 7



10.Find the resistance at terminals $A - B$ in the network in Figure8

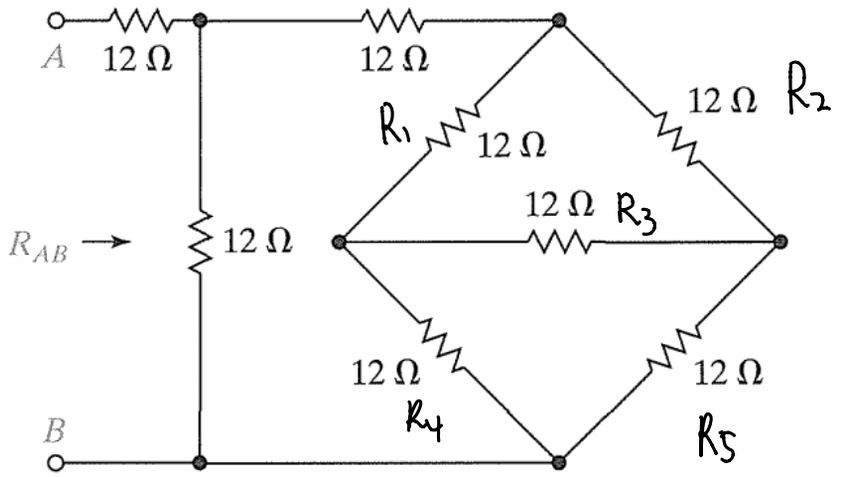
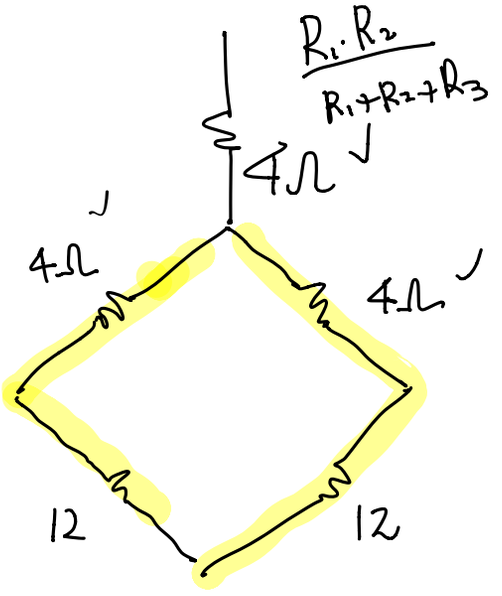


Figure 8



$\frac{144}{36} = 4\Omega$

$\frac{1}{R_T} = \frac{1}{16} + \frac{1}{16} = \frac{1}{8}$

$\frac{1}{12} + \frac{1}{24} = \frac{3}{24} = \frac{1}{8}$