M R

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دوائر كهربية	الكـــترونيات
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- تواصل مستمر مع معلم المادة

للتواصل

0567630097

0565657741

1-7 Single-Loop or Series Circuit

mesh

EXAMPLE 1-11

For the circuit of Figure 1-24, determine (a) loop current, (b) voltages across all resistances, and (c) power delivered or absorbed by each component in the circuit.

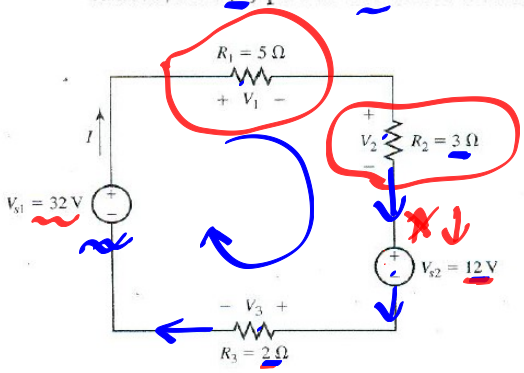


FIGURE 1–24
Circuit of Example 1-11.

$I = \frac{V_1}{R}$

$V_1 = 5I$

$I = \frac{V_2}{3}$

15. V. L

$-32 + V_1 + V_2 + 12 + V_3 = 0$

$5I \quad 3I \quad 2I$

$-32 + 5I + 3I + 12 + 2I = 0$

$\frac{10I}{10} = \frac{20}{10} \Rightarrow I = 2A$

$V_1 = 10V$ ✓ $\quad V_2 = 6V$ ✓ $\quad V_3 = 4V$

$I.V \quad \frac{V^2}{R} = I^2R$

$P_{s_1} = 2 * 32 = 64\ w$

$P_1 = 2 * 10 = 20\ w$

$P_2 = 4 * 3 = 12w$

$P_{s_2} = 2 * 12\ w$

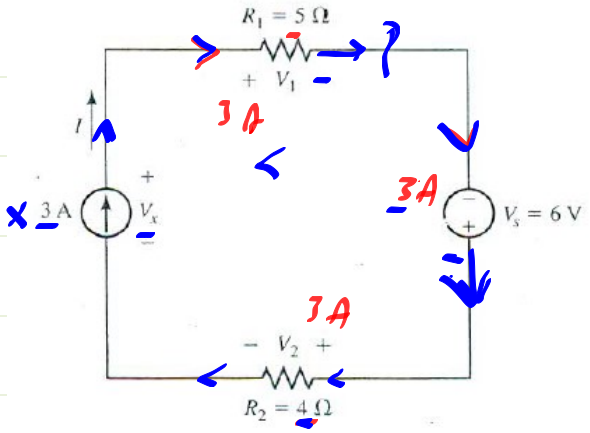
$P_3 = \frac{4^2}{2} = 8w$

Variable	Power delivered	Power absorbed
V_{s1}	64	
V_1		20
V_2		12
V_{s2}		24
V_3		8
	64 w	64 w

2h 1h

EXAMPLE 1-12

For the circuit of Figure 1-25, determine (a) loop current, (b) voltages across all resistances, (c) voltage across the current source, and (d) power delivered or absorbed by each component in circuit.



$I = 3$ A

$V = IR$

$-V_1 + V_x - V_2 + 6 = 0$

$-15 + V_x - 12 + 6 = 0$

$V_x = 21$ V

$V_1 = IR_1 = 3 \times 5 = 15$ V

$V_2 = 12$ V

Variable	Power delivered	Power absorbed
V_x	63	
V_1		45
V_s	18	
V_2		36
	81 W	81 W

$P_x = I \cdot V = 3 \times 21 = 63$ W

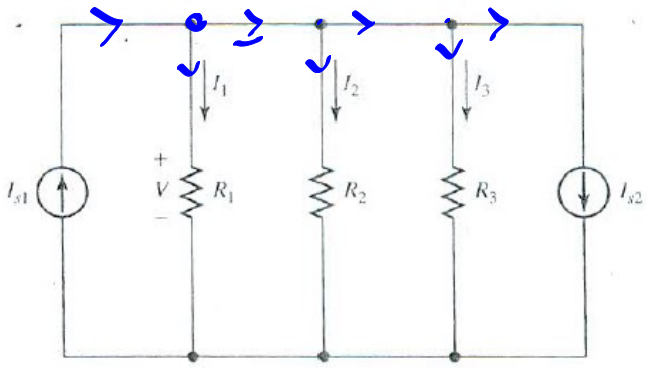
$P_1 = 3 \times 15 = 45$ W

$P_s = 18$ W

$P_2 = 3 \times 12 = 36$ W

loop - mesh

1-8 Single Node-Pair or Parallel Circuit



EXAMPLE 1-13

For the circuit of Figure 1-28, determine (a) voltage across the circuit, (b) currents through the three resistances, (c) current through voltage source, and (d) all values of power delivered and power absorbed.

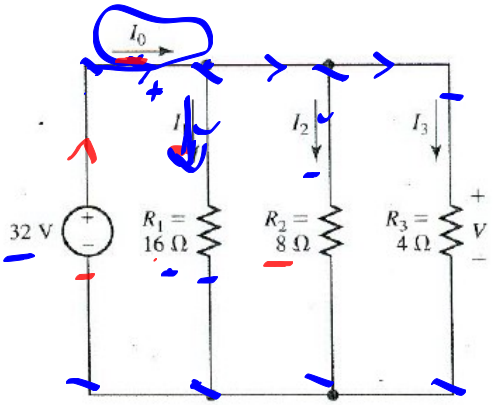


FIGURE 1–28
Circuit of Example 1-13.

$V = 32V$

$I_0 = I_1 + I_2 + I_3$

$I_0 = 2 + 4 + 8 = 14\ A$

$I_1 = \frac{V}{R_1} = \frac{32}{16} = 2\ A$

$I_2 = \frac{V}{R_2} = \frac{32}{8} = 4\ A$

$I_3 = \frac{32}{4} = 8\ A$

$P = I \cdot V = V^2 R = I^2 R$

$2^2 \times 16$

$4^2 \times 8$

$8^2 \times 4$

Variable	Power delivered	Power absorbed
V	448	
R_1		64
R_2		128
R_3		256
		448 w

EXAMPLE 1-14

For the circuit of Figure 1-29, determine (a) voltage across the node pair, (b) current through each of the resistances, and (c) all values of power delivered and absorbed.

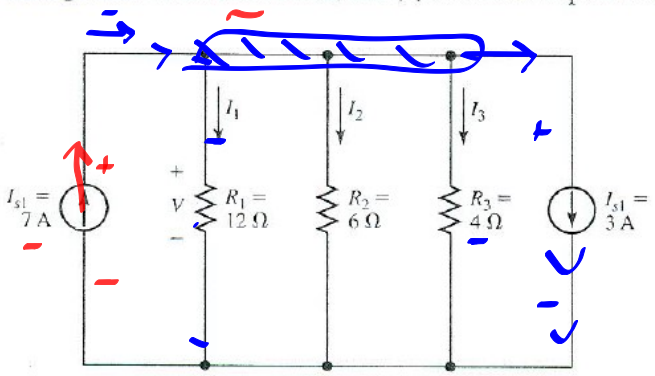


FIGURE 1–29
Circuit of Example 1-14.

15 . C . Q

$-7 + I_1 + I_2 + I_3 + 3 = 0$

$\frac{V}{12} + \frac{2V}{6} + \frac{3V}{4} = 4 \Rightarrow \frac{6V}{6} = \frac{24}{6}$

$V = 8\,V$ $= 8V$

$I_1 = \frac{V}{R_1} = \frac{8}{12} = 0.67A$

$I_2 = \frac{V}{R_2} = \frac{8}{6} = 1.33$

$I_1 = \frac{V}{R_1} = \frac{8}{4} = 2A$

$7 * 8$

$0.67^2 * 12$

$1.33^2 * 6$

$I^2R = I.V = 3 * 8$

Variable	Power delivered	Power absorbed
I_{s1}	56 W	
R_1		5.39
R_2		10.6
R_3		16
I_{s2}		24
	56	56 W

1-9 Voltage and Current Divider Rules