

P12 - 9.2 - Redraw Circuits Notes

Parallel in Series

1st Redraw

2 $R_T = 5 + 1.2$
 $R_T = 6.2\Omega$

3 $V = IR$
 $I = \frac{V}{R}$
 $I = \frac{12}{6.2}$
 $I = 1.94A$

4 $V = IR$
 $V = 1.94(5)$
 $V = 9.68V$
 $V = IR$
 $V = 1.94(1.2)$
 $V = 2.32V$

5 $V = IR$
 $I = \frac{V}{R}$
 $I = \frac{2.32}{2}$
 $I = 1.16A$
 $V = IR$
 $I = \frac{V}{R}$
 $I = \frac{2.32}{3}$
 $I = 0.77A$

$R_T = 1.2\Omega$
 $V_T = V_1 = V_2$
 $I_T = I_1 = I_2$

Check
 $V_T = V_1 + V_2$
 $12 = 2.32 + 9.68$ ✓

Parallel in Series

Parallel/Series
 $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$
 $R_T = R_1 + R_2$

Total
 $V = IR$

Parallel
 $V_T = V_1 = V_2$
 $I_T = I_1 + I_2$

Series
 $I_T = I_1 = I_2$
 $V_T = V_1 + V_2$

Series in Parallel

1st Redraw

2 $R_T^* = \frac{R_1 R_2}{R_1 + R_2}$
 $R_T^* = \frac{2(3)}{2+3}$
 $R_T^* = 1.2\Omega$

3 $V = IR$
 $I = \frac{V}{R}$
 $I = \frac{12}{1.2}$
 $I = 10A$

4 $V = IR$
 $I = \frac{V}{R}$
 $I = \frac{12}{3}$
 $I = 4A$
 $V_T = V_1 = V_2$
 $I_T = I_1 = I_2$

5 $V = IR$
 $V = 4(1)$
 $V = 4V$
 $V = IR$
 $V = 4(2)$
 $V = 8V$
 $I_T = I_1 = I_2$
 $I_T = 4A$
 $I_T = 8V$
 $I = 6A$

Check
 $V_T = V_1 + V_2$
 $12 = 4 + 8$ ✓

Series in Parallel

Series/Parallel
 $R_T = R_1 + R_2$
 $R_T^* = \frac{R_1 R_2}{R_1 + R_2}$

Total
 $V = IR$

Series
 $I_T = I_1 = I_2$
 $V_T = V_1 + V_2$

Parallel
 $V_T = V_1 = V_2$
 $I_T = I_1 + I_2$