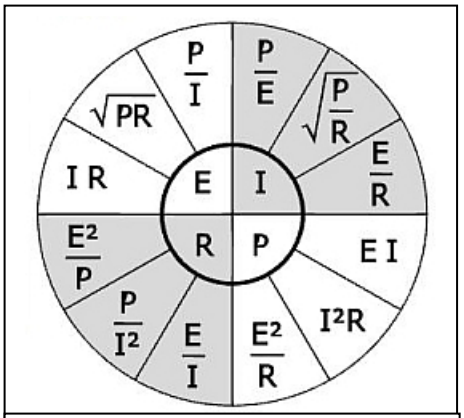
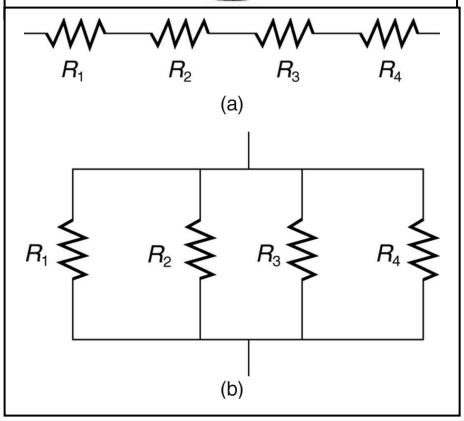
INFORMATION SHEET 5: Ohm's Law Practice





R1 = 10 Ohms R3 = 30 Ohms
R2 = 20 Ohms R4 = 40 Ohms
Each circuit connects to 12Volts

Analyzing circuits (a) and (b) [1]

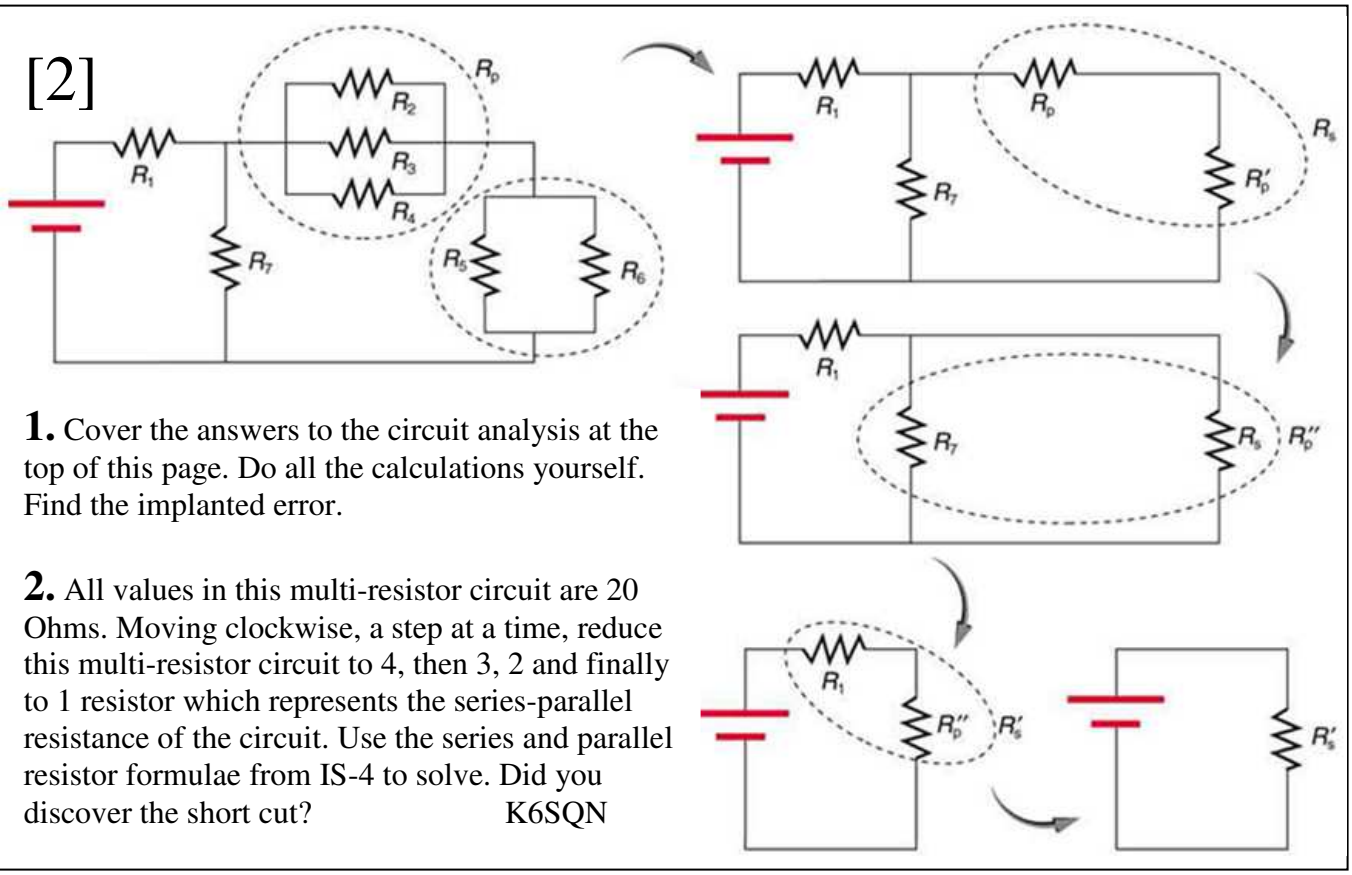
Series Circuit:

Total Resistance	$R_1+R_2+R_3+R_4$		= 100 Ohms
Circuit Current:	$E/R_{total} = I$	= 12/100	= .12 Amperes
Circuit Power:	E x I = P	= 12 x .12	= 1.44 Watts
Volts across R1:	I x R_1	= .12 x 10	= 1.2 Volts
Volts across R2:	I x R_2	= .12 x 20	= 2.4 Volts
Volts across R3:	I x R_3	= .12 x 30	= 3.6Volts
Volts across R4:	I x R_4	= .12 x 40	= 4.8 Volts
Power in R1	E_1 x I	= 1.2 x .12	= .144 Watts
Power in R2	E_2 x I	= 2.4 x .12	= .288 Watts
Power in R3	E_3 x I	= 3.6 x .12	= .423 Watts
Power in R4	E4 x I	= 4.8 x .12	= .576 Watts

Parallel Circuit:

Total Resistance	$1/R_1+1/R_2+1/R_3+1/R_4 = 1/R_{total}$		
Current thru R1:	E/R_1	= 12/10	= 1.2 Amperes
Current thru R2:	E/R_2	= 12/20	= 0.6 Amperes
Current thru R3:	E/R_3	= 12/30	= 0.4 Amperes
Current thru R4:	E/R_4	= 12/40	= 0.3 Amperes
Circuit Current:	$I_1 + I_2 + I_3 + I_4$		= 2.5 Amperes
Circuit Power	E x I_T	= 12 x 2.5	= 30 Watts
Power in R1:	E x I_1	=12 x 1.2	= 14.4 Watts
Power in R2:	E x I_2	= 12 x .6	= 7.2 Watts
Power in R3:	E x I_3	= 12 x .4	= 4.8 Watts
Power in R4:	E x I_4	= 12 x .3	= 3.6 Watts

[2]



1. Cover the answers to the circuit analysis at the top of this page. Do all the calculations yourself. Find the implanted error.

2. All values in this multi-resistor circuit are 20 Ohms. Moving clockwise, a step at a time, reduce this multi-resistor circuit to 4, then 3, 2 and finally to 1 resistor which represents the series-parallel resistance of the circuit. Use the series and parallel resistor formulae from IS-4 to solve. Did you discover the short cut? K6SQN