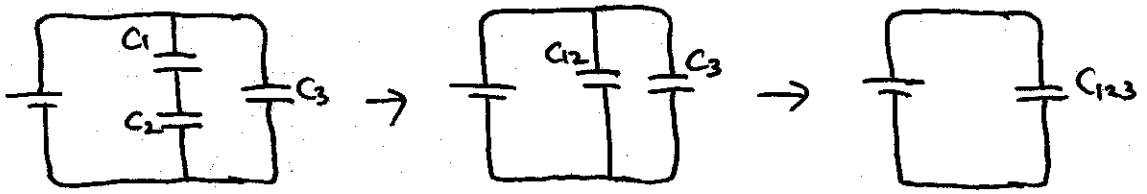
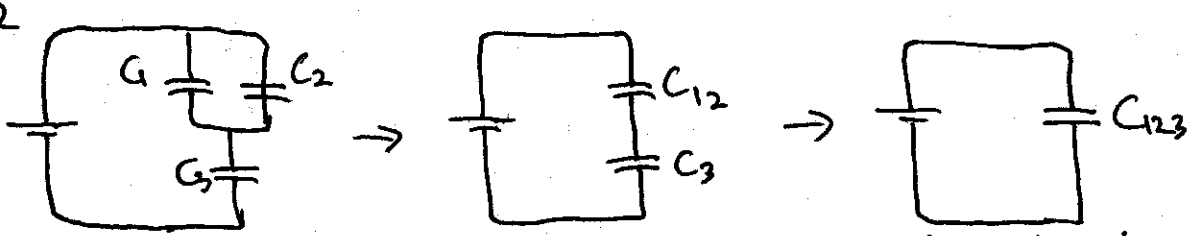
30.61



$\frac{1}{C_{12}} = \frac{1}{C_1} + \frac{1}{C_2}$ $\qquad C_{123} = C_{12} + C_3$

30.62



$C_{12} = C_1 + C_2$ $\qquad \frac{1}{C_{123}} = \frac{1}{C_{12}} + \frac{1}{C_3}$

30.64 $C_{12} = C_1 + C_2$, $\frac{1}{C_{123}} = \frac{1}{C_{12}} + \frac{1}{C_3}$

$Q_1 + Q_2 = Q_3 = (C_{123})(9V)$

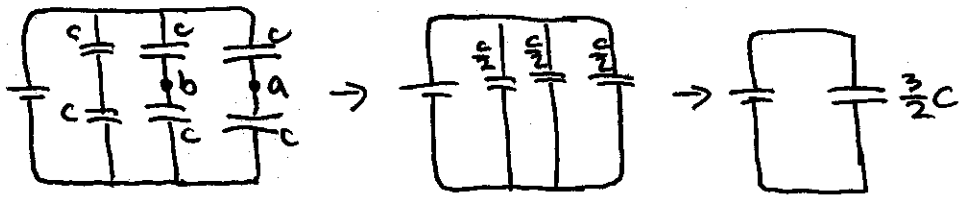
$V_3 = Q_3 / C_3$

$V_1 = V_2 = (Q_1 + Q_2)/C_{12} = \frac{C_{123}(9V)}{C_1 + C_2}$

$Q_1 = C_1 V_1$, $Q_2 = C_2 V_2$

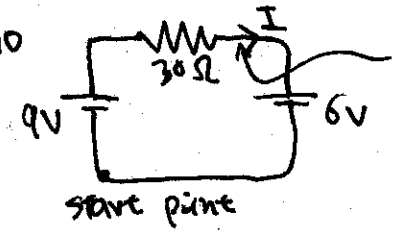
30.68

original circuit →



~~$V_b - V_a = 0$~~

31.10



Arbitrarily choose the direction

$9V - I\,30\Omega - 6V = 0$

$I = \frac{3V}{30\Omega} = 0.1\,A$

The current has the direction in our initial choice of direction because I is positive.

31.12 $I = \frac{15V}{10\Omega + 20\Omega} = \frac{1}{2}A$

(Part A) : $\Delta V = I \cdot 10\Omega = 5V$

(Part B) : $\Delta V = I \cdot 20\Omega = 10\,V$

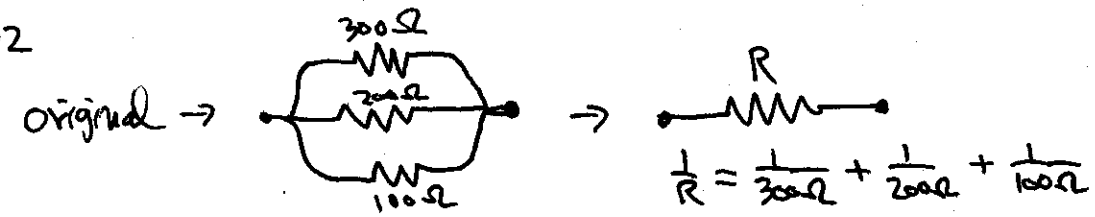
31.14

(a) $I = \frac{9V}{12\Omega + 15\Omega} = \frac{9}{27} A = \frac{1}{3} A$

$P = I^2R = \left(\frac{1}{9}A^2\right)(12\Omega) = \frac{12}{9} W = \frac{4}{3} W$

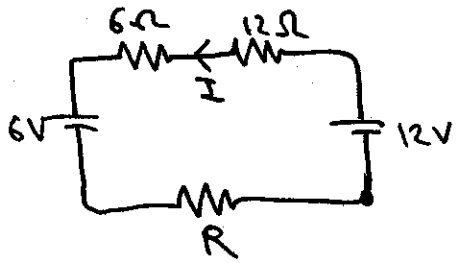
(b) $P = I^2R = \left(\frac{1}{9}A^2\right)(15\Omega) = \frac{15}{9} W = \frac{5}{3} W$

31.32



$\frac{1}{R} = \frac{1}{300\Omega} + \frac{1}{200\Omega} + \frac{1}{100\Omega}$

31.50



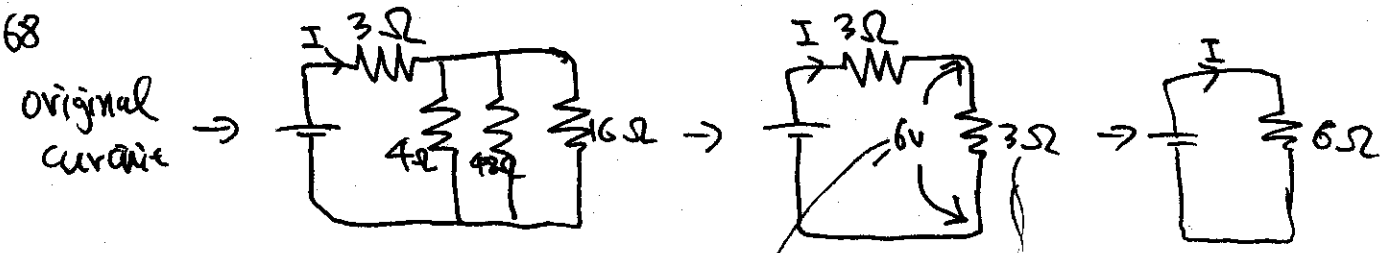
$12V - 12\Omega I - 6\Omega I - 6V - RI = 0$

$\Rightarrow R = \frac{6V}{I} - 18\Omega = \frac{6V}{1/4\,A} - 18\Omega = 6\Omega$

Direction of current is counter clockwise

Power $= I^2R = \left(\frac{1}{4}\right)^2 6\ W = \frac{6}{16} W$

31.68



(a) $I = \frac{12V}{6\Omega} = 2A$

(b) $\Delta V = IR = (2A)(3\Omega) = 6V$

(c) ΔV across $4\Omega, 48\Omega, 16\Omega = I(3\Omega) = 6V$

$I = 6V/4\Omega = \frac{3}{2} A$

(d) 6V

(e) $I = 6V/48\Omega = 0.125A$

(f) 6V

(g) $I = 6V/16\Omega = 0.375A$

(h) 6V