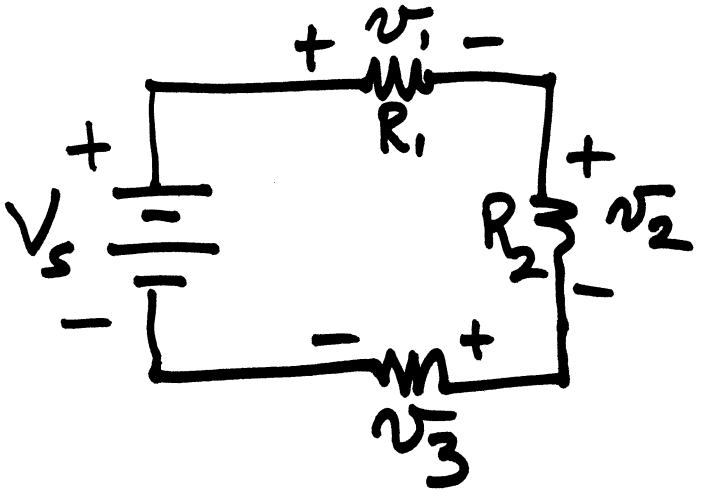
VOLTAGE DIVIDER (series circuit)

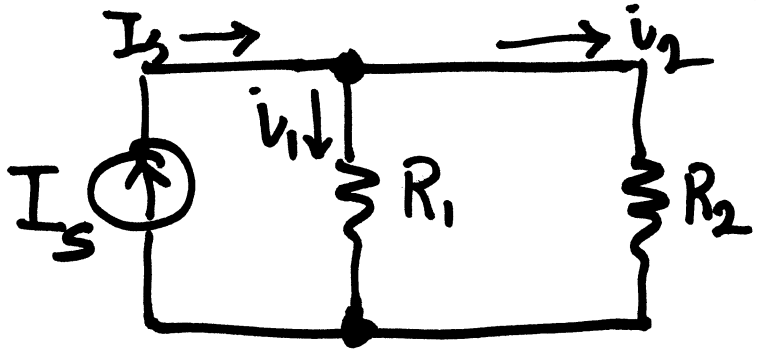


$$v_2 = \frac{R_2}{R_1+R_2+R_3} V_s$$

$$v_1 = \frac{R_1}{R_1+R_2+R_3} V_s$$

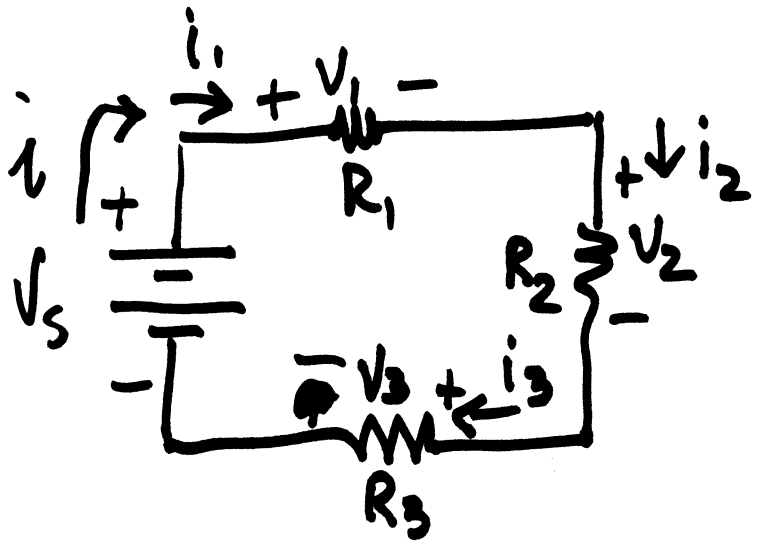
$$v_3 = \frac{R_3}{R_1+R_2+R_3} V_s$$

CURRENT DIVIDER (parallel circuit)



$$i_2 = \frac{R_1}{R_1+R_2} I_s$$

$$i_1 = \frac{R_2}{R_1+R_2} I_s$$



series: $i = i_1 = i_2 = i_3$

KVL $\sum v = 0$

$\circlearrowright$ $-V_s + V_1 + V_2 + V_3 = 0$

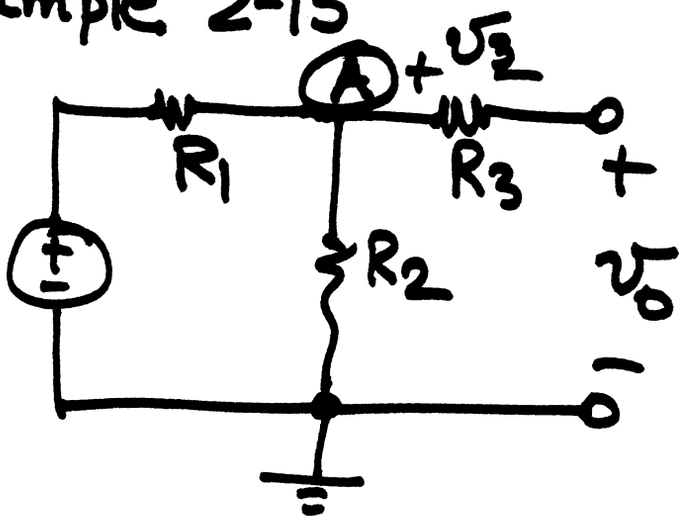
$-V_s + iR_1 + iR_2 + iR_3 = 0$

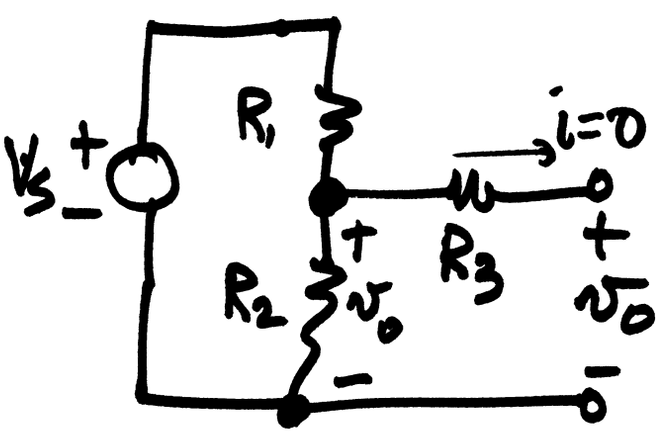
$V_s = i(R_1 + R_2 + R_3)$

$$i = \frac{V_s}{R_1 + R_2 + R_3}$$

$$V_2 = iR_2 = \frac{R_2}{R_1 + R_2 + R_3} V_s$$

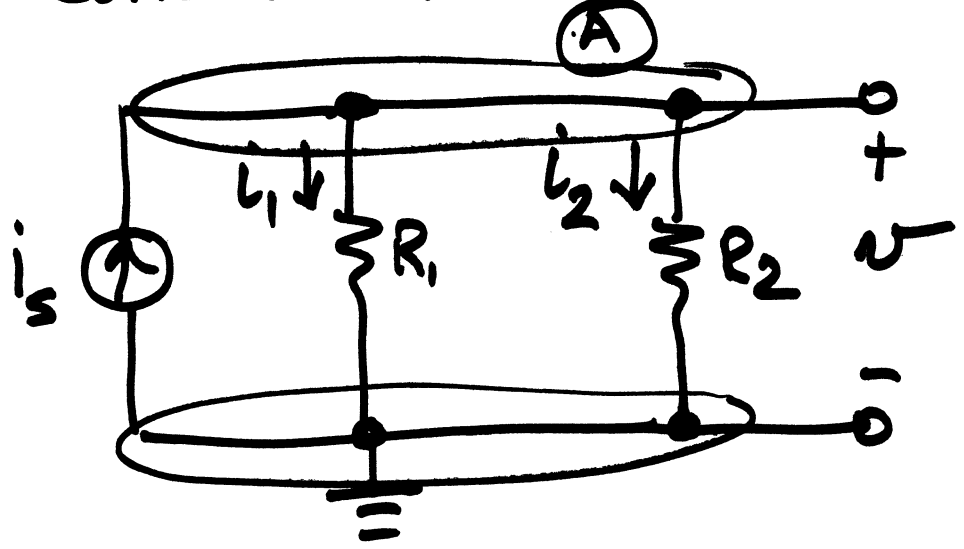
Example 2-15





$$v_o = \frac{R_2}{R_1+R_2} V_s$$

current divider



$v = i_2 R_2$

$v = i_1 R_1$

KCL $\sum_{+in} i$ $\quad +i_s - i_1 - i_2 = 0$

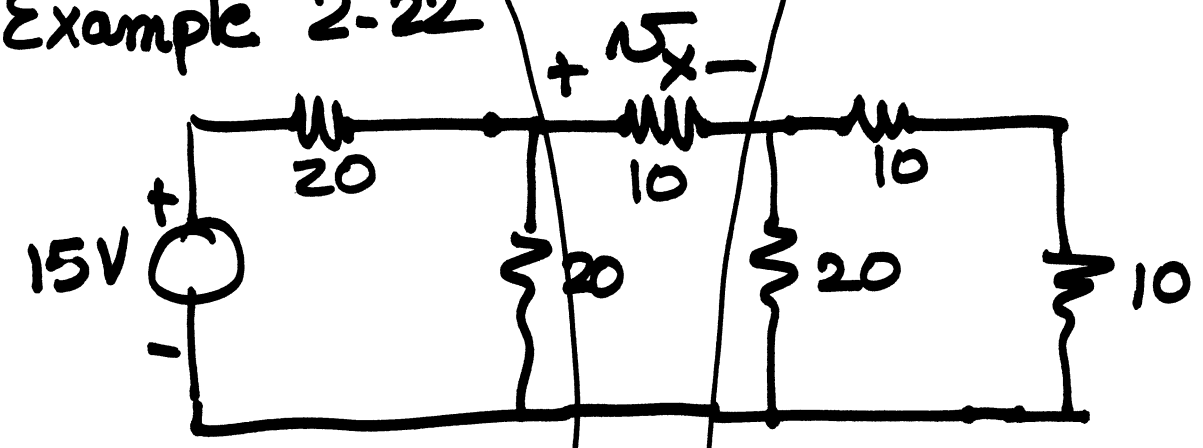
$$i_s - \frac{v}{R_1} - \frac{v}{R_2} = 0$$

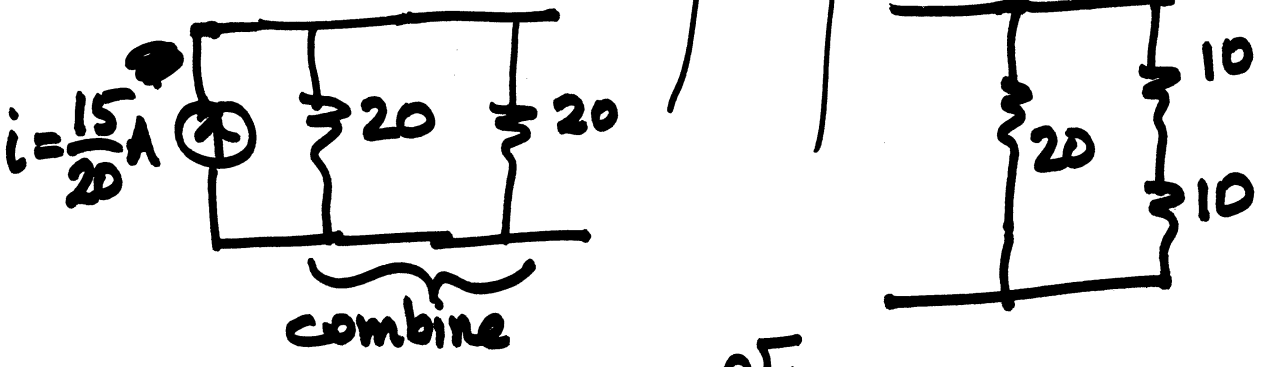
$$i_s - \left(\frac{1}{R_1} + \frac{1}{R_2}\right) v = 0$$

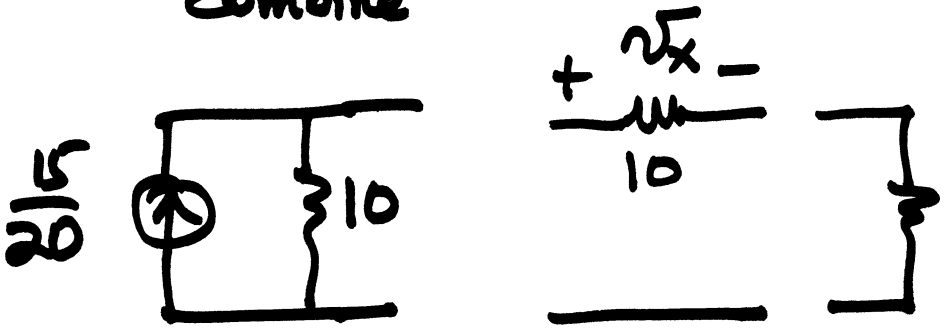
$$v = \frac{R_1 R_2}{R_1 + R_2} i_s$$

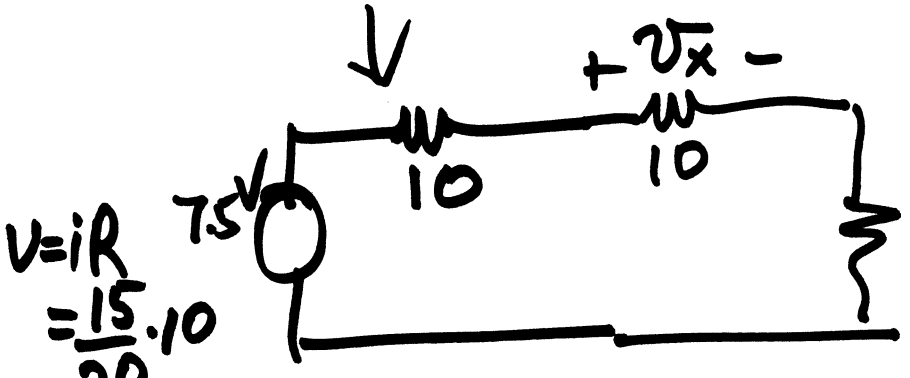
$$i_1 = \frac{v}{R_1} = \frac{1}{R_1}\left(\frac{R_1 R_2 i_s}{R_1 + R_2}\right) = \boxed{\frac{R_2 i_s}{R_1 + R_2}}$$

Example 2-22









$V = iR$

$= \frac{15}{20} \cdot 10$

$V = 7.5\,V$