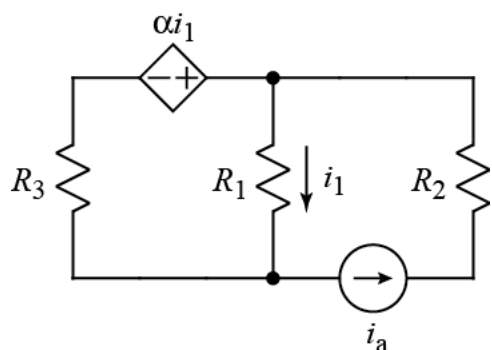
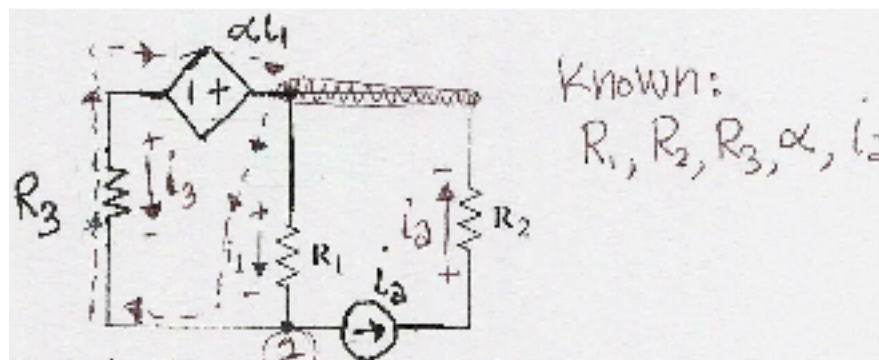


Ex:



Derive an expression for  $i_1$ . The expression must contain no other parameters than  $i_a$ ,  $R_1$ ,  $R_2$ ,  $R_3$ , and  $\alpha$ . **Note:**  $\alpha < 0$ . (Hint: It is not just a voltage or current divider.)

SOL'N:



V-loop:  $+i_3 R_3 + \alpha i_1 - R_1 i_1 = 0$

①  $i_3 R_3 + i_1 (\alpha - R_1) = 0$

Current summation at ②

$-i_3 - i_1 + i_a = 0$

③  $i_3 = i_a - i_1$

plugging  $i_3$  into ①  $\Rightarrow$

$i_a R_3 - i_1 R_3 + i_1 (\alpha - R_1) = 0$

$i_1 (R_3 - \alpha + R_1) = i_a R_3$

$$i_1 = \frac{i_a R_3}{(R_1 + R_3 - \alpha)}$$