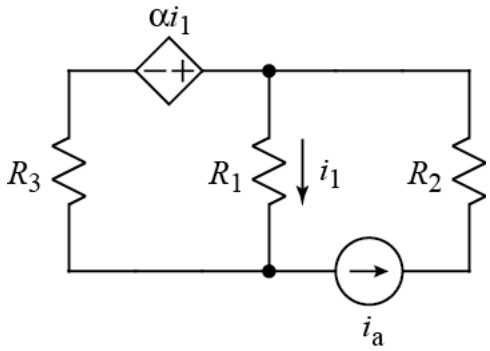
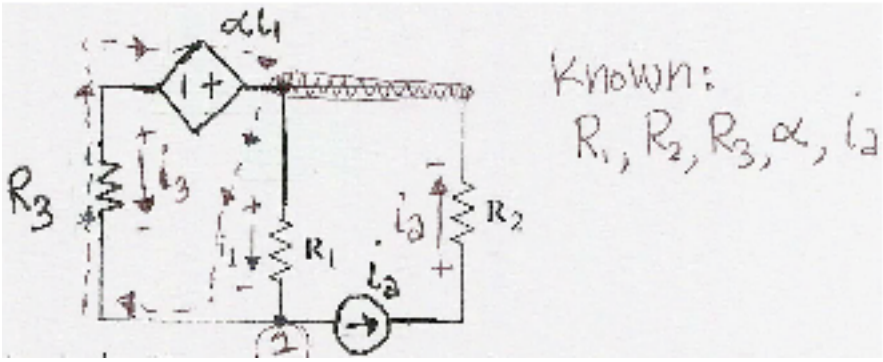
Ex:



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

SOL'N:



V-loop: $+i_3R_3 + \alpha i_1 - R_1 i_1 = 0$

① $i_3R_3 + i_1(\alpha - R_1) = 0$

Current Summation at ②

$-i_3 - i_1 + i_a = 0$

③ $i_3 = i_a - i_1$

plugging i_3 into ① ⇒

$i_aR_3 - i_1R_3 + i_1(\alpha - R_1) = 0$

$i_1(R_3 - \alpha + R_1) = i_aR_3$

$$i_1 = \frac{i_aR_3}{(R_1 + R_3 - \alpha)}$$