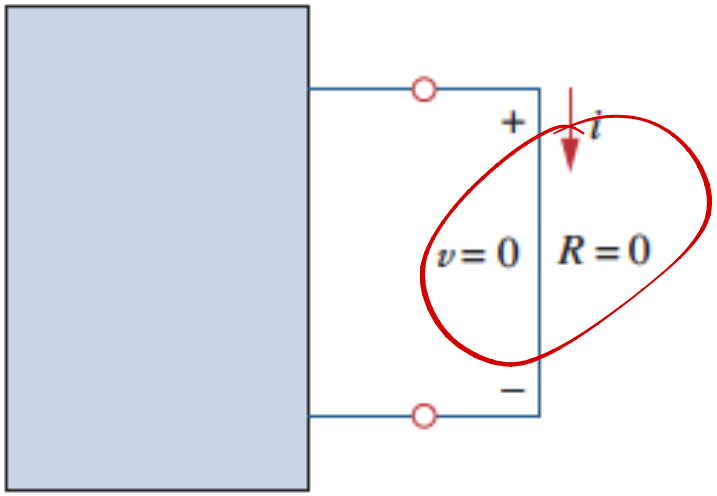
Basics – 7

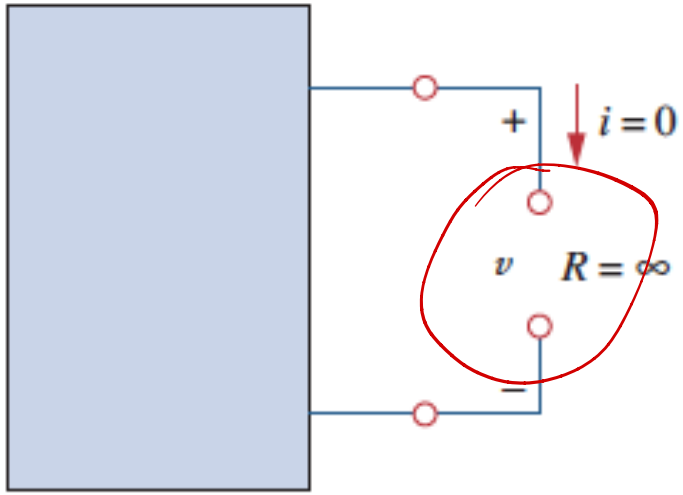
odds and ends

Special Cases

- Short circuit (R = 0)

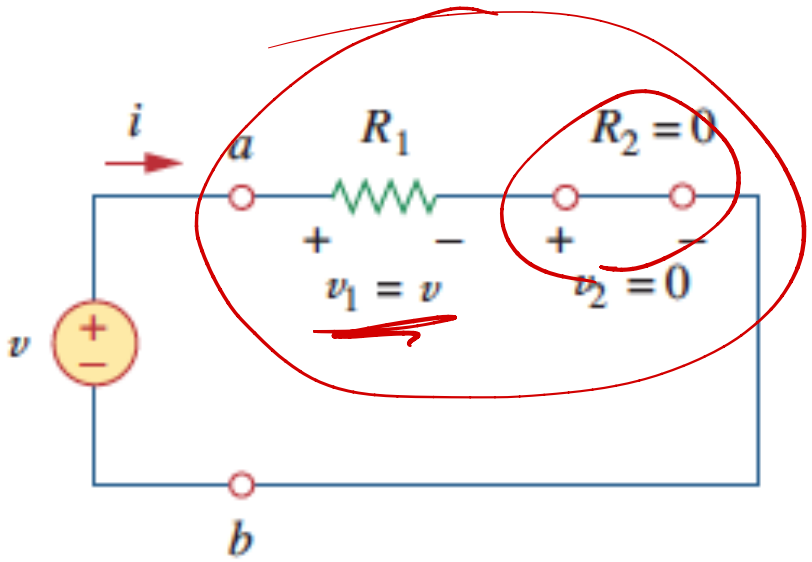


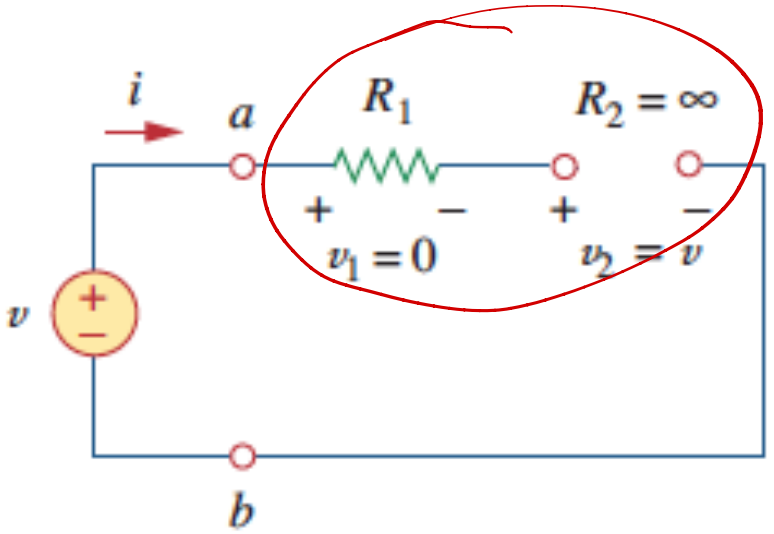
- Open circuit (R = infinity)



- Voltage division

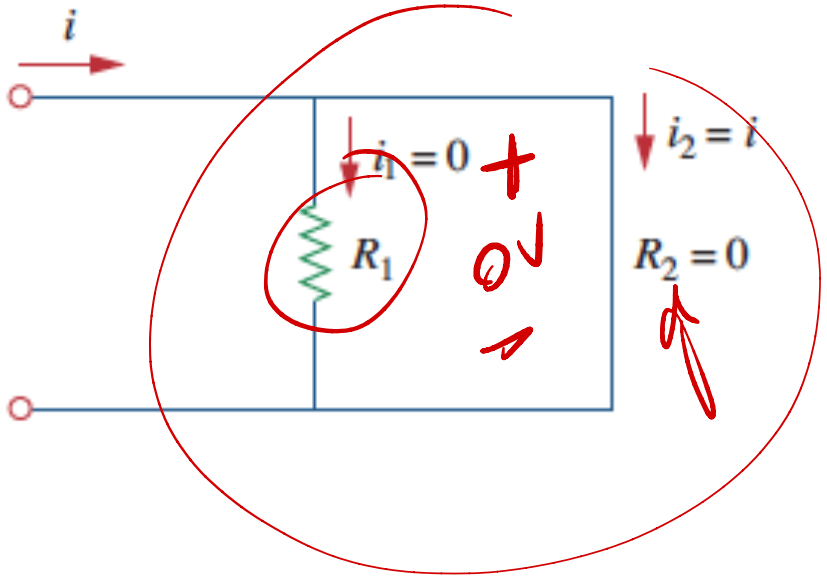
$$v_1 = \frac{R_1}{R_1 + R_2} v \qquad v_2 = \frac{R_2}{R_1 + R_2} v$$

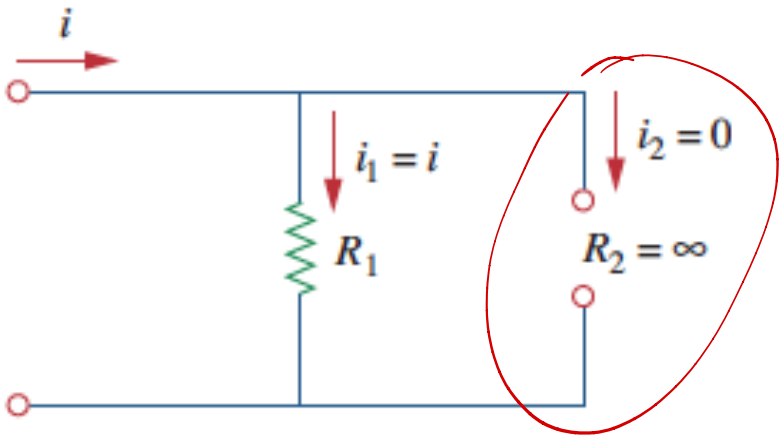




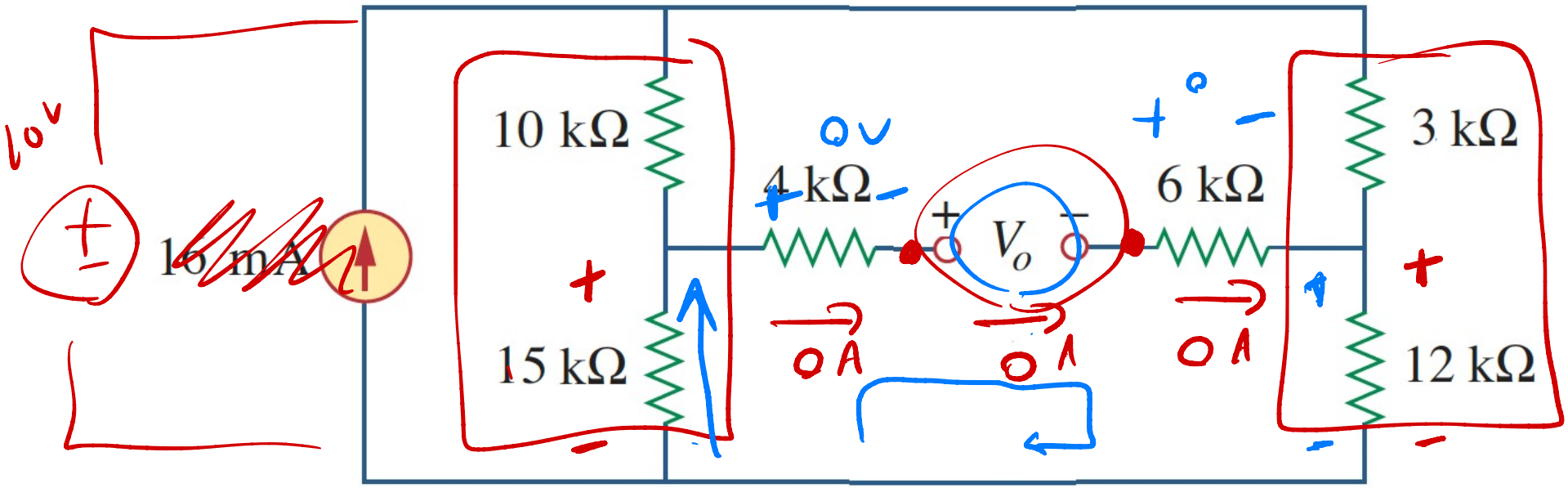
- Current division

$$i_1 = \frac{R_2}{R_1 + R_2} i \qquad i_2 = \frac{R_1}{R_1 + R_2} i$$





Example:



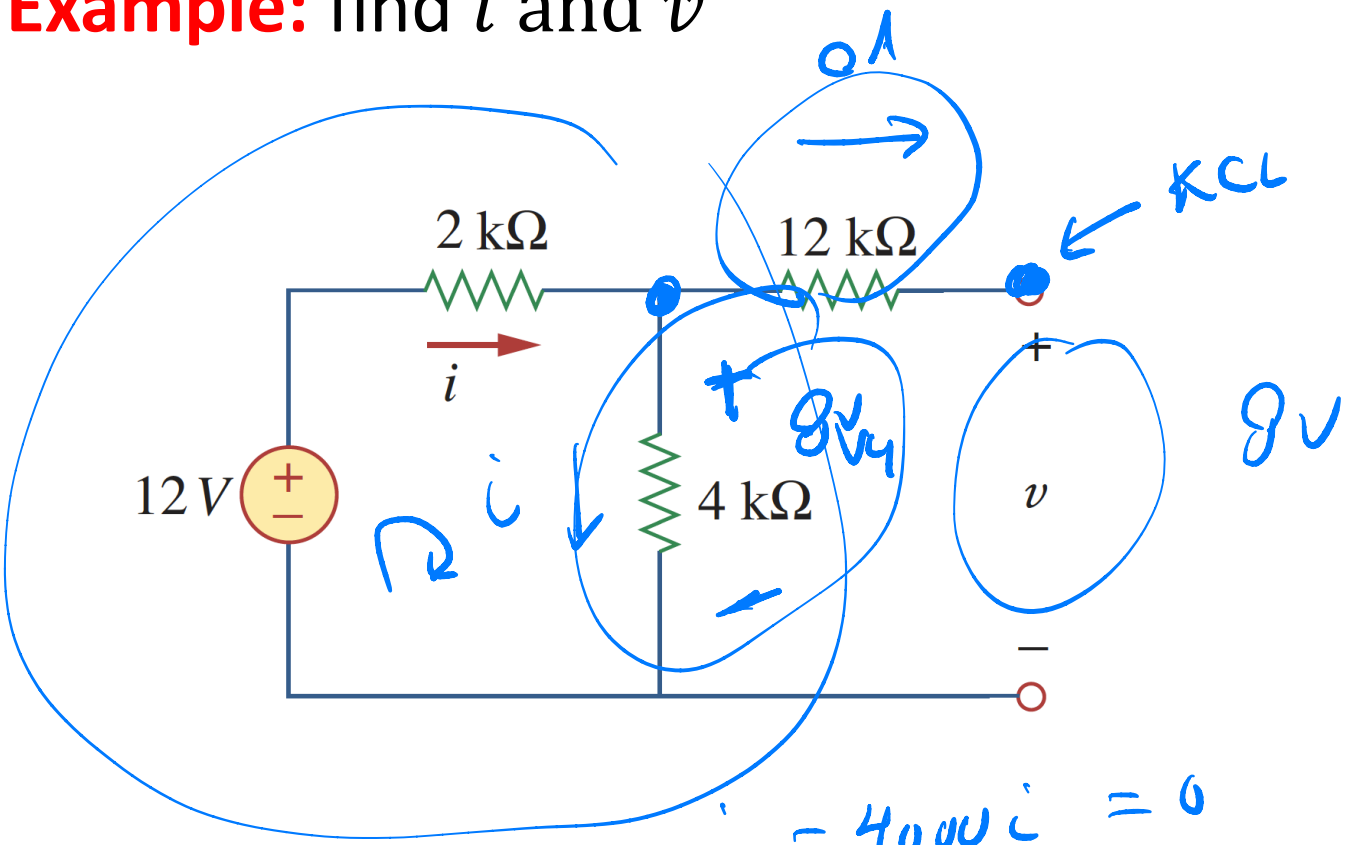
$\frac{15}{25} \cdot 10 = 6V$

$10 \cdot \frac{12}{15} = 8V$

KVL: $6 - 0 - V_o - 0 - 8 = 0$

$-2V = V_o$

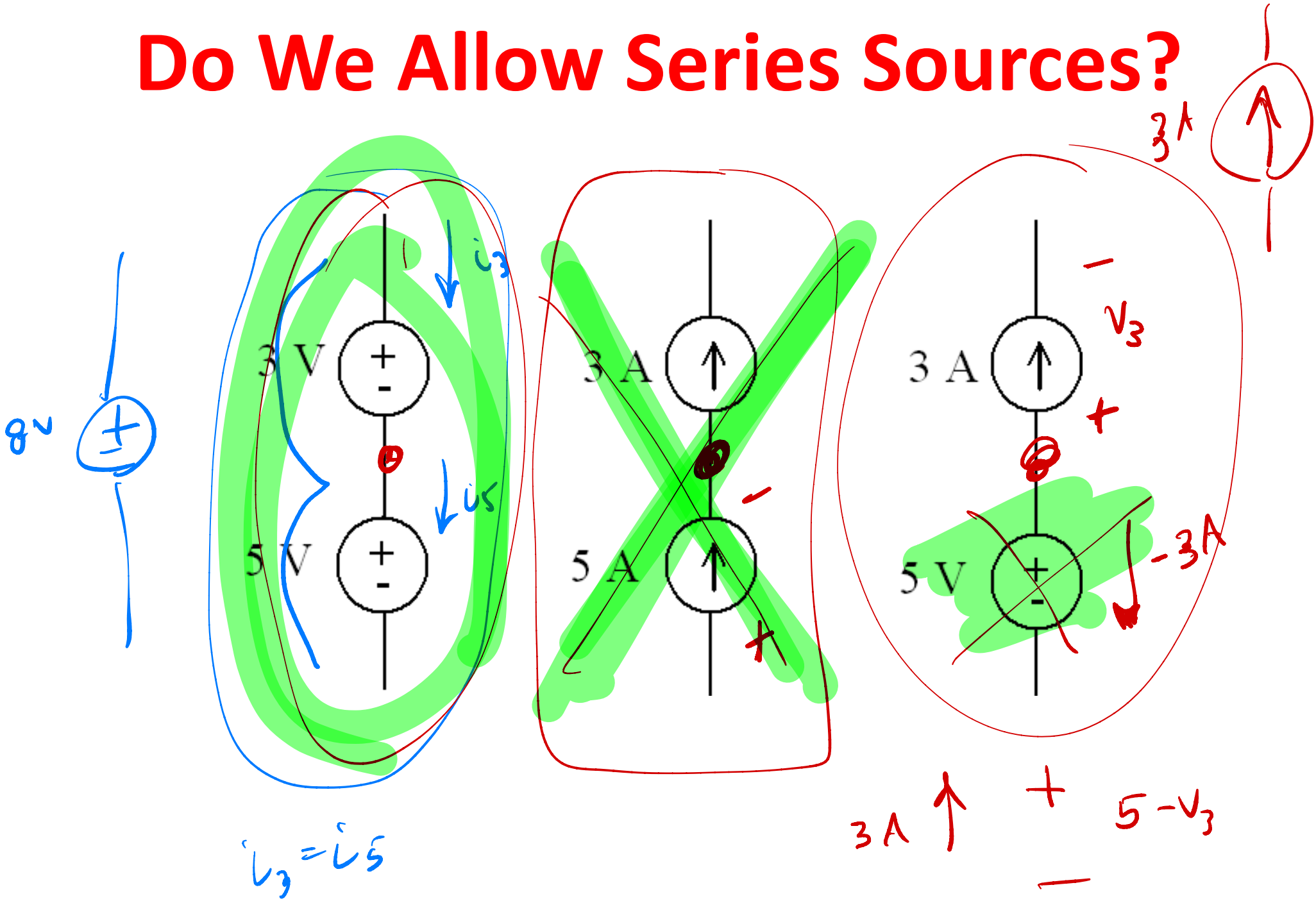
Example: find i and v



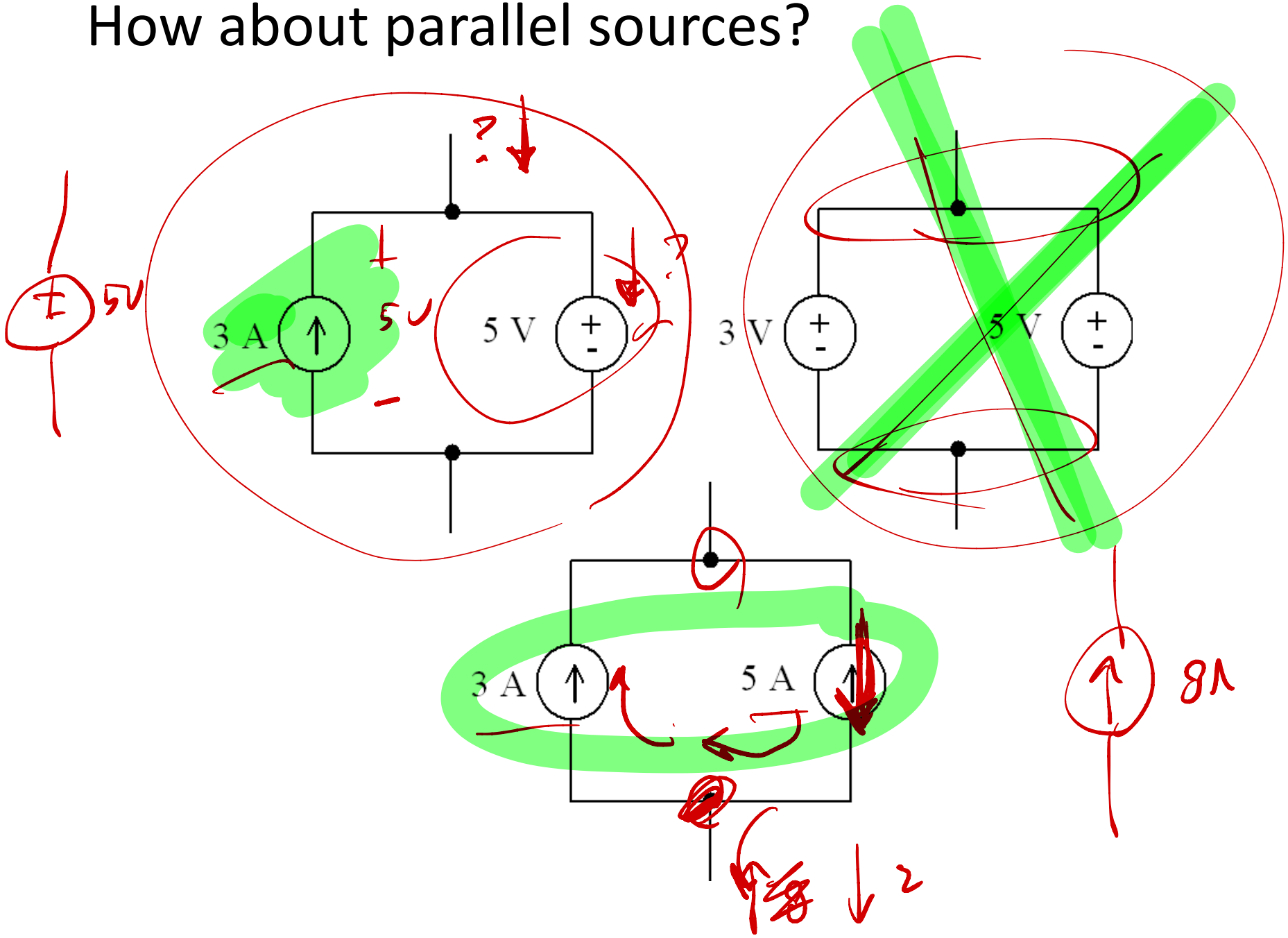
$12 - 2000\,i - 4000\,i = 0$

$v_4 = \frac{4000}{2+4000} \cdot 12 = 8\ V$

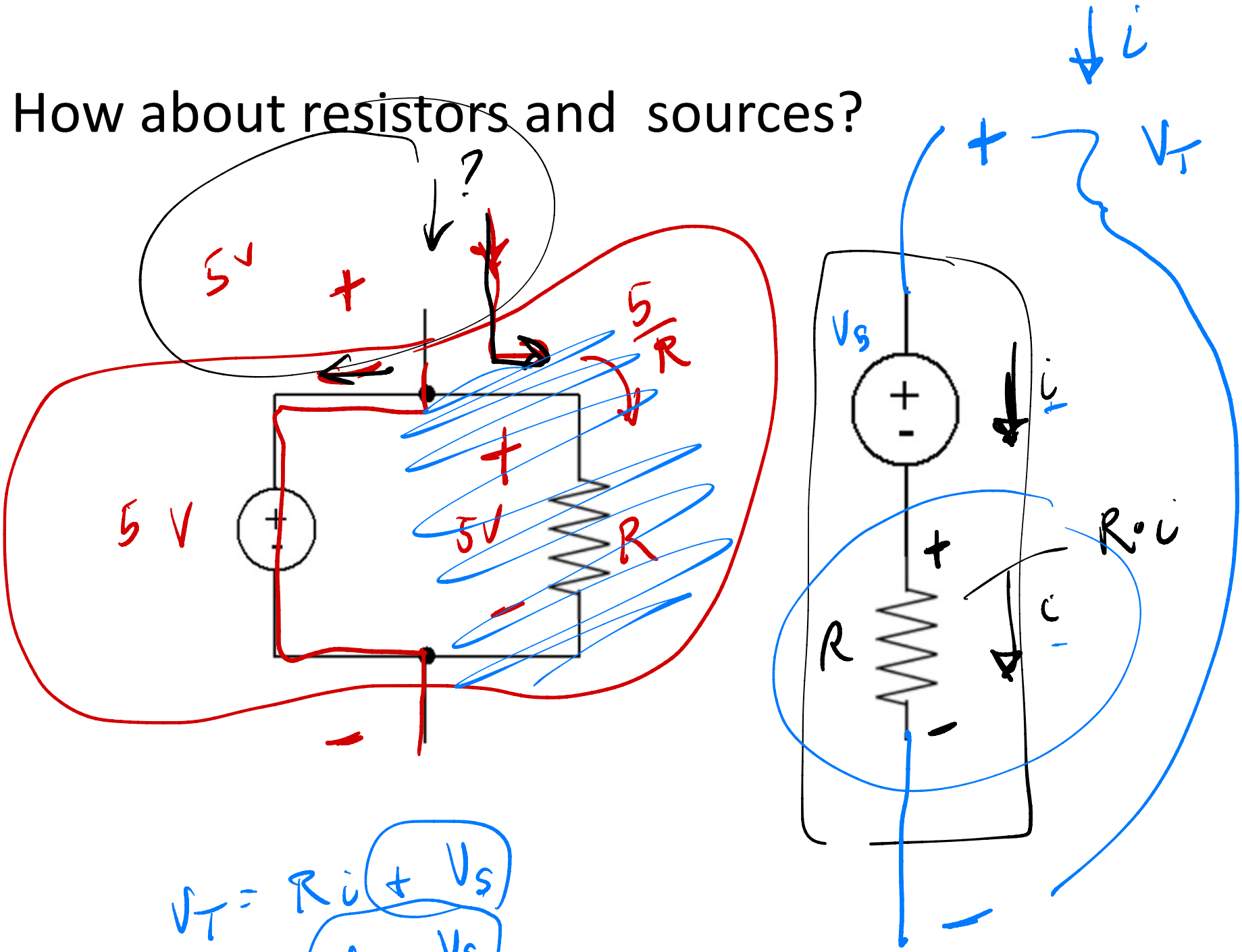
Do We Allow Series Sources?



How about parallel sources?

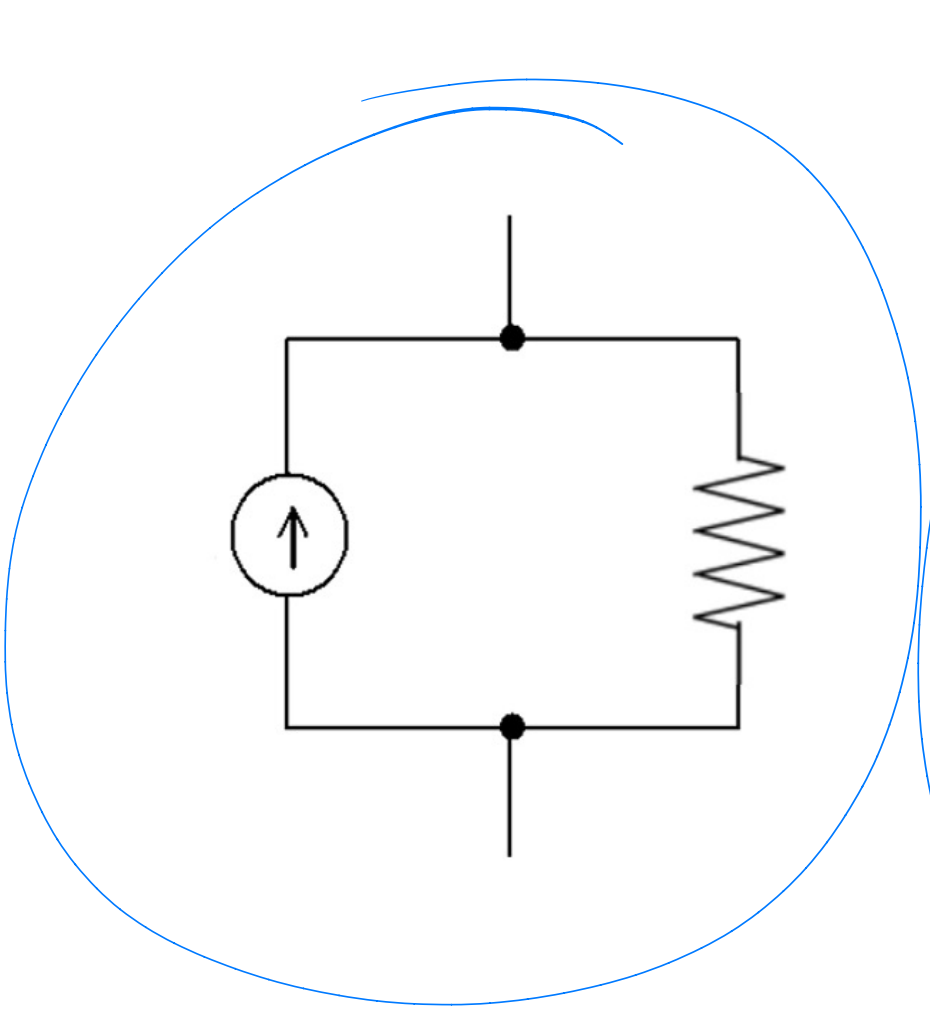


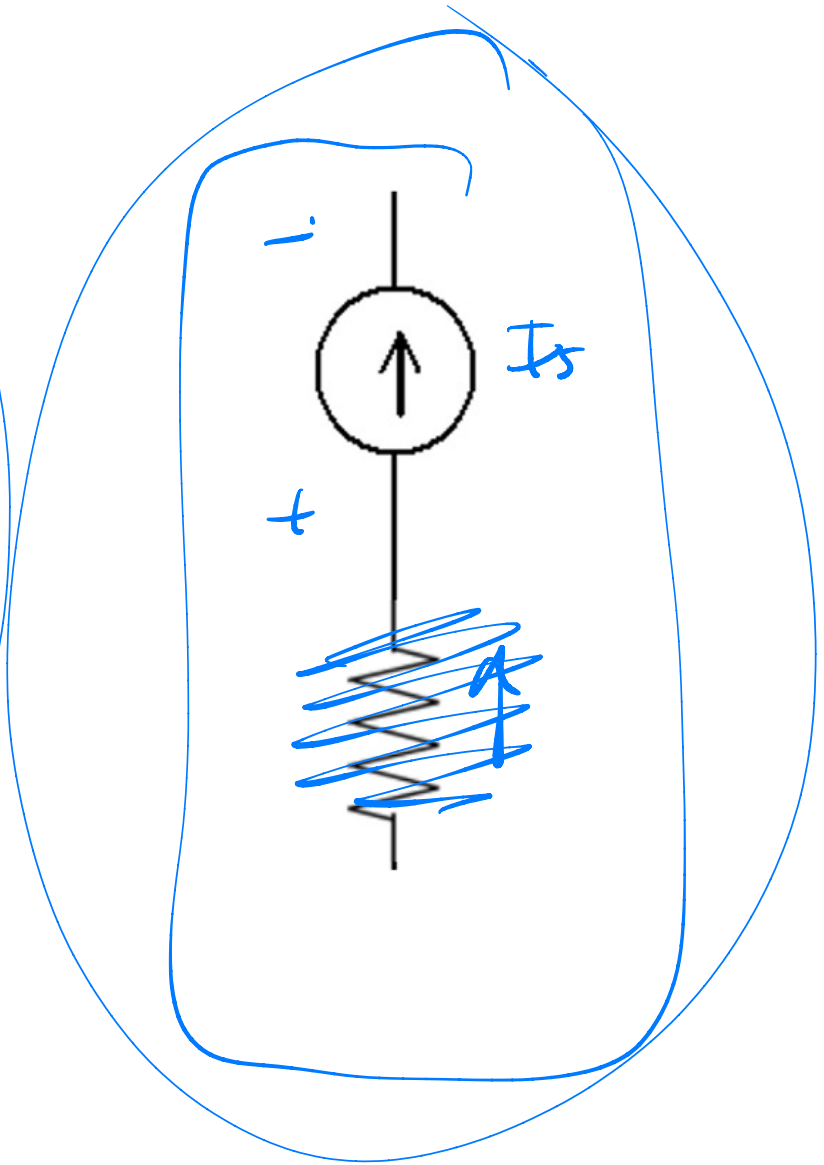
How about resistors and sources?



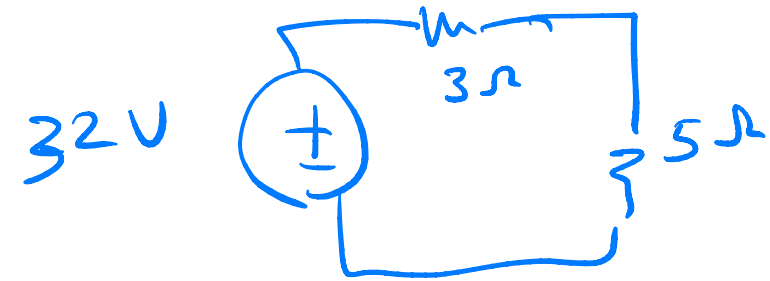
$$V_T = Ri + V_S$$

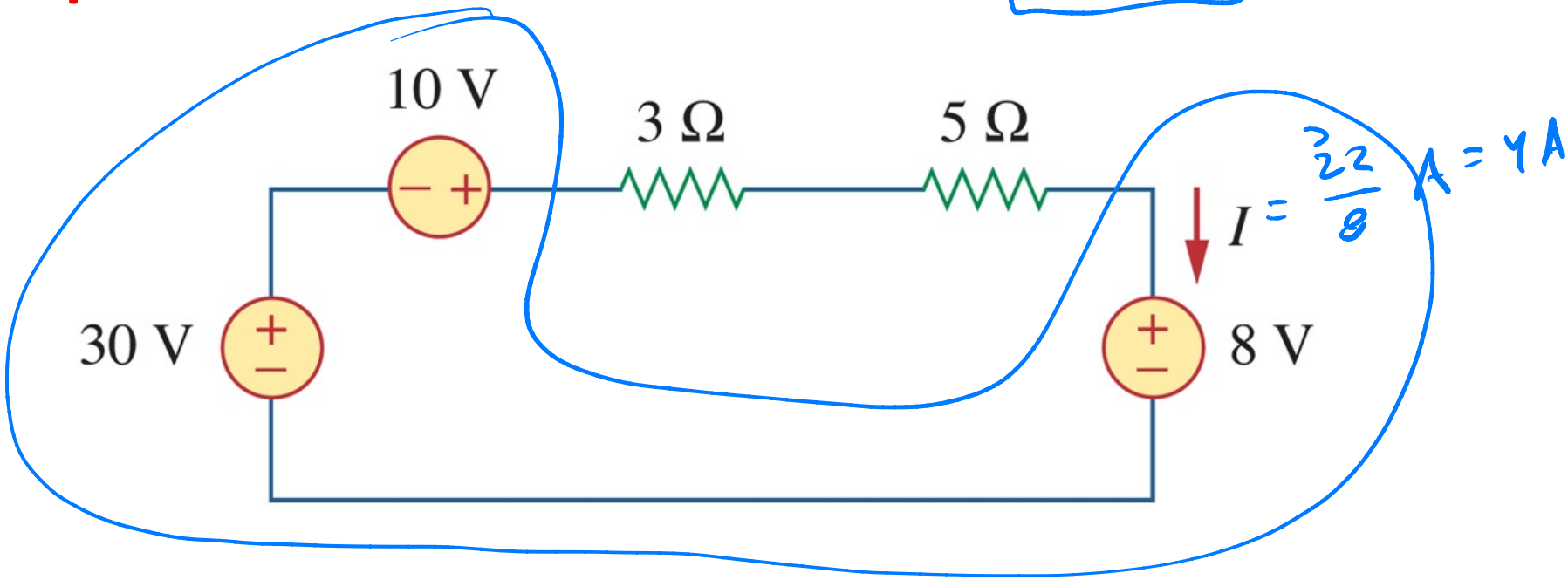
$$i_T = \frac{V_T - V_S}{R}$$



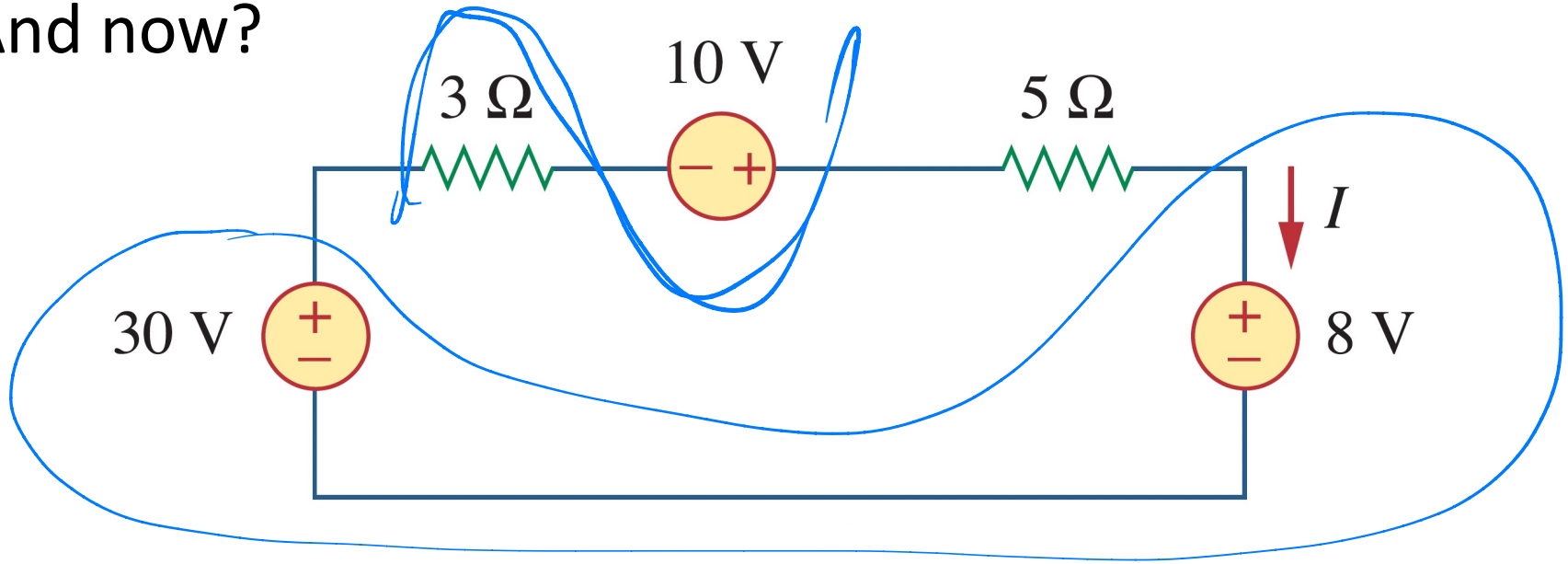

-
Is
+

Example: find I





And now?



Time Varying Example

- What happens now?