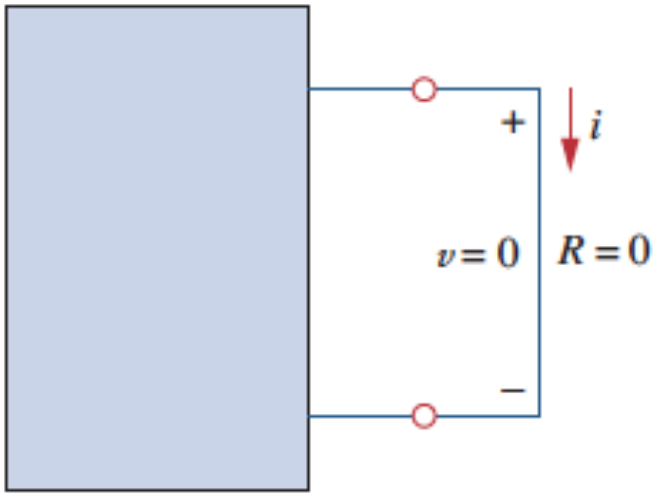
Lecture 7
Basics – 7 of 7

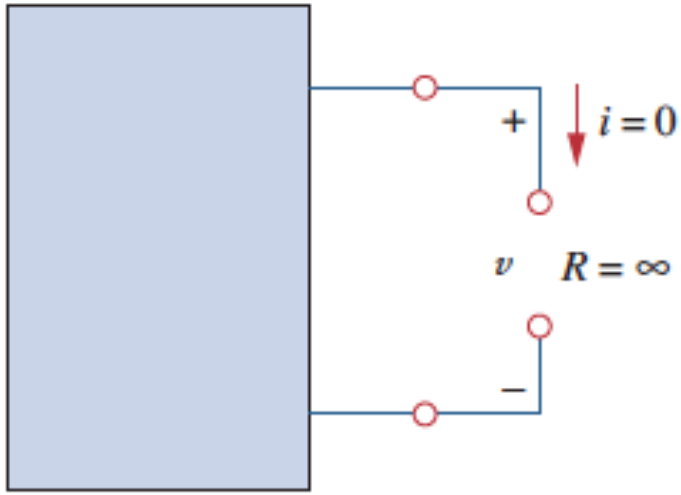
odds and ends

Special Cases

- Short circuit (R = 0)



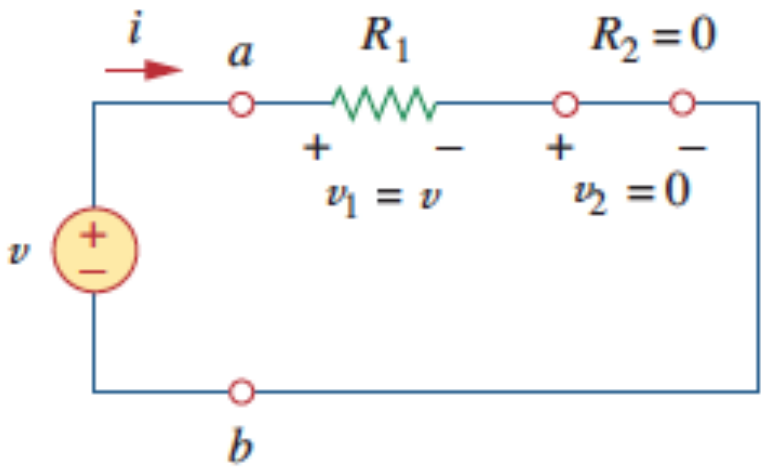
- Open circuit (R = infinity)

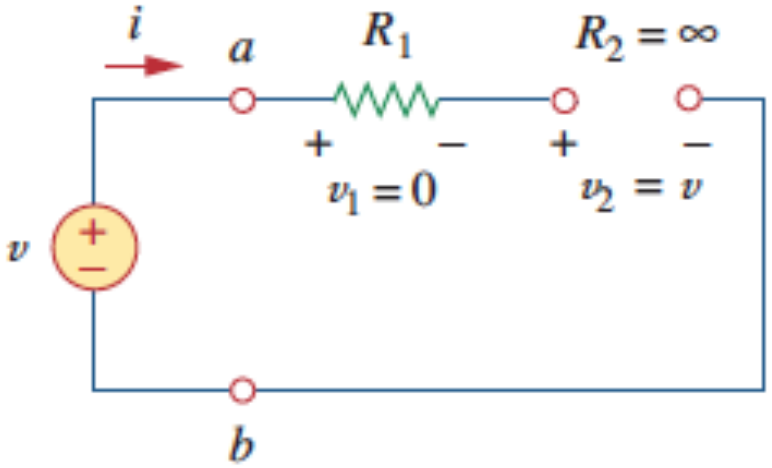


- Voltage division

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

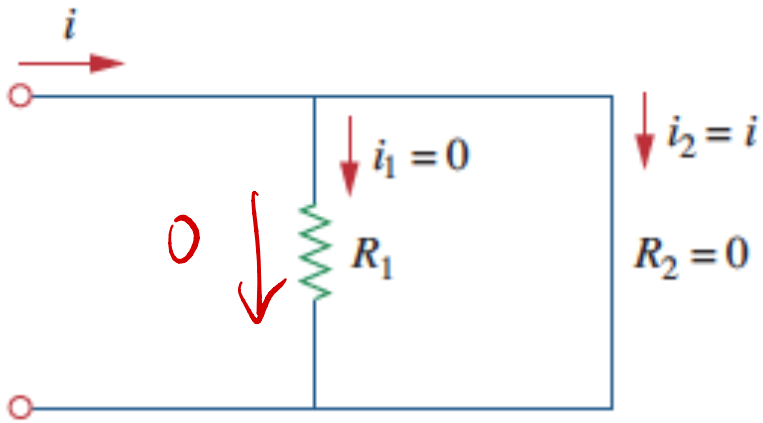
$$v_2 = \frac{R_2}{R_1 + R_2} v$$

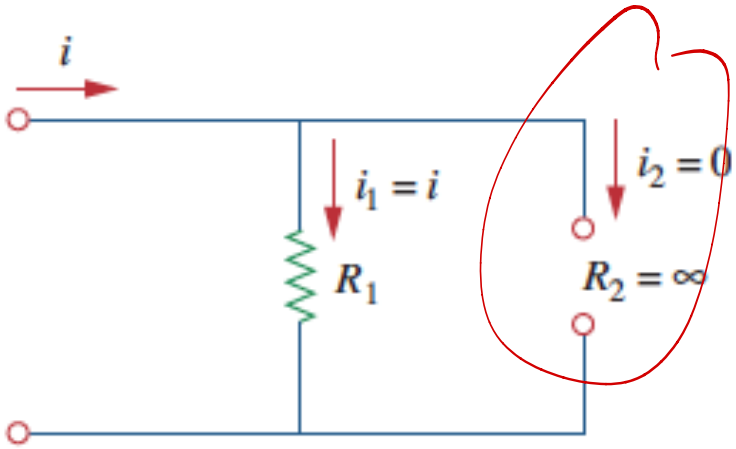




- Current division

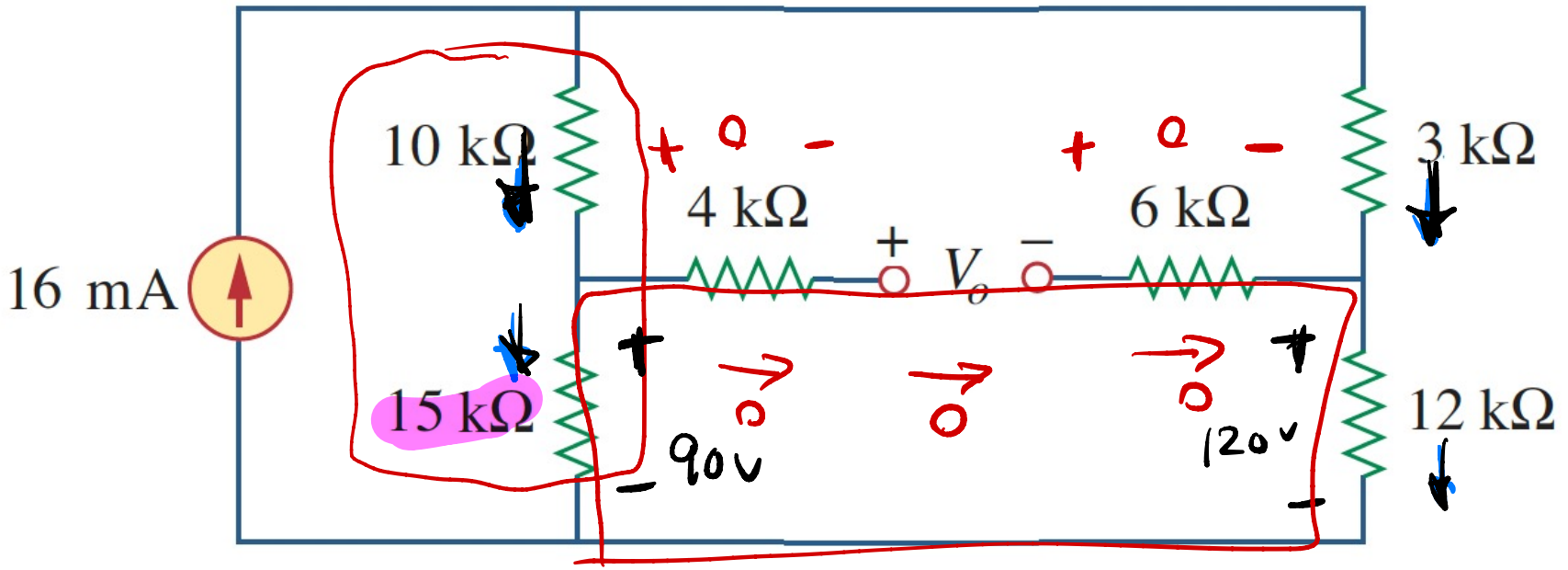
$$i_1 = \frac{R_2}{R_1 + R_2} i \qquad i_2 = \frac{R_1}{R_1 + R_2} i$$

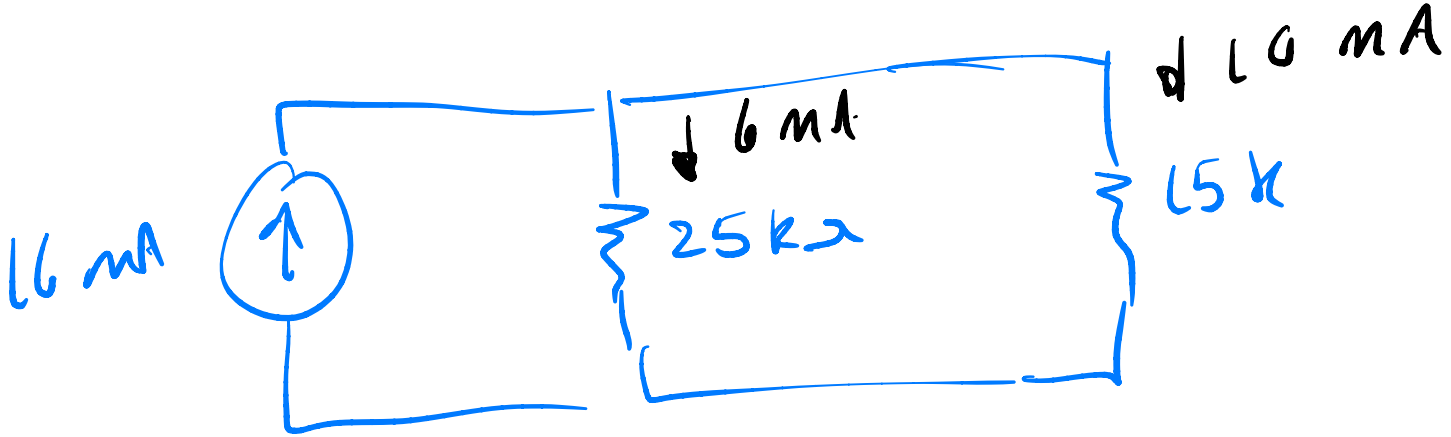




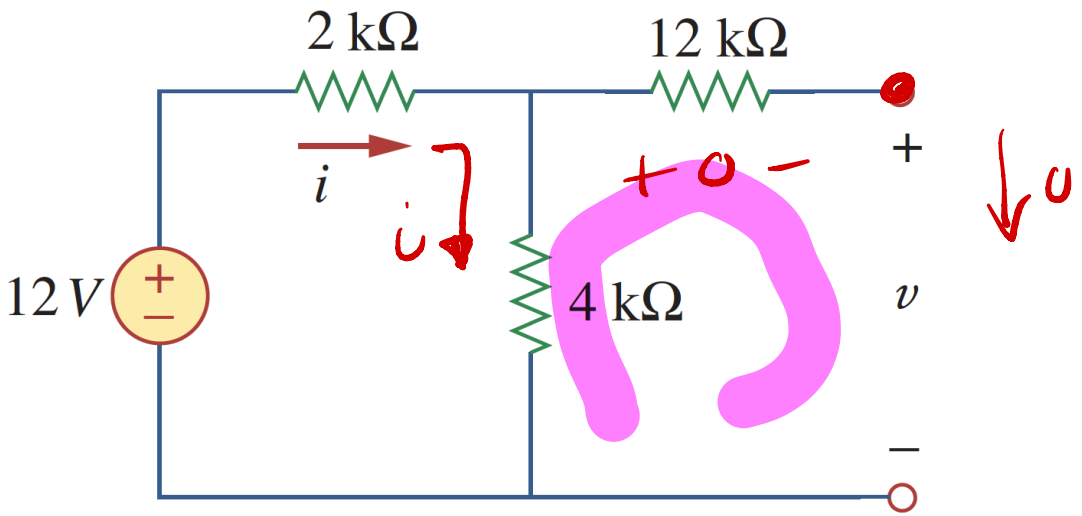
$V_o = -30\ V$

Example:





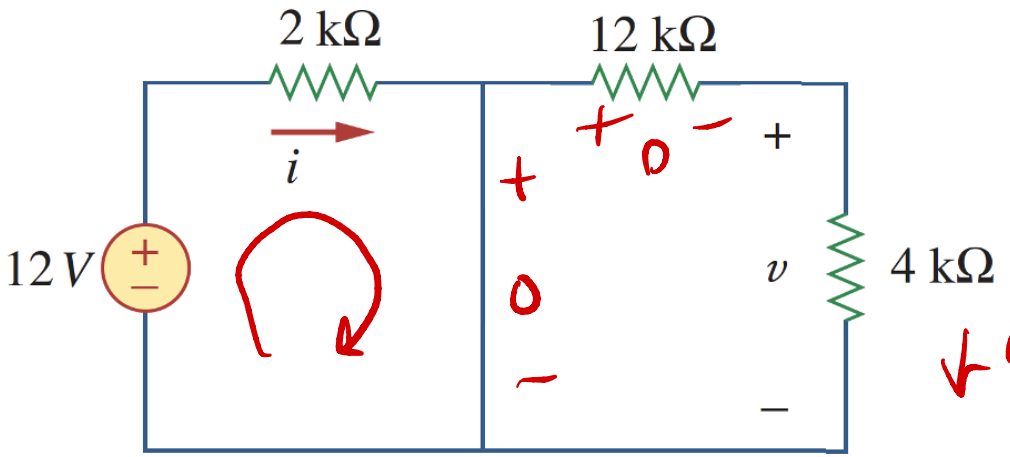
Example: find i and v



$$V_4 = \frac{4k}{4k + 2k} \cdot 12v = \boxed{8v}$$

$$i = \frac{8v}{4k} = \boxed{2mA}$$

Example: find i and v



$+ v_2 -$ → 0

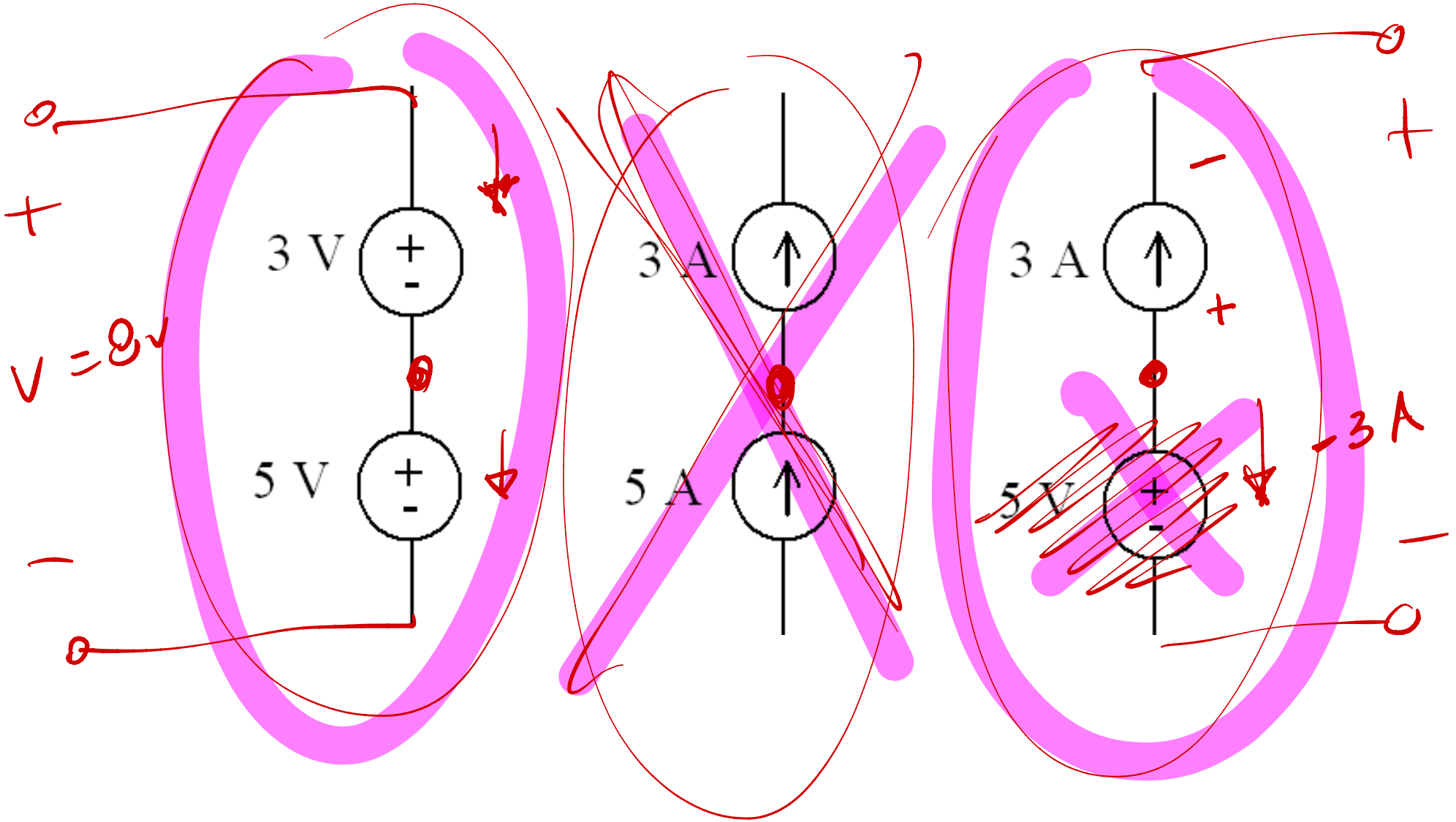
$v = 0$ volts

$12 - v_2 - 0 = 0$

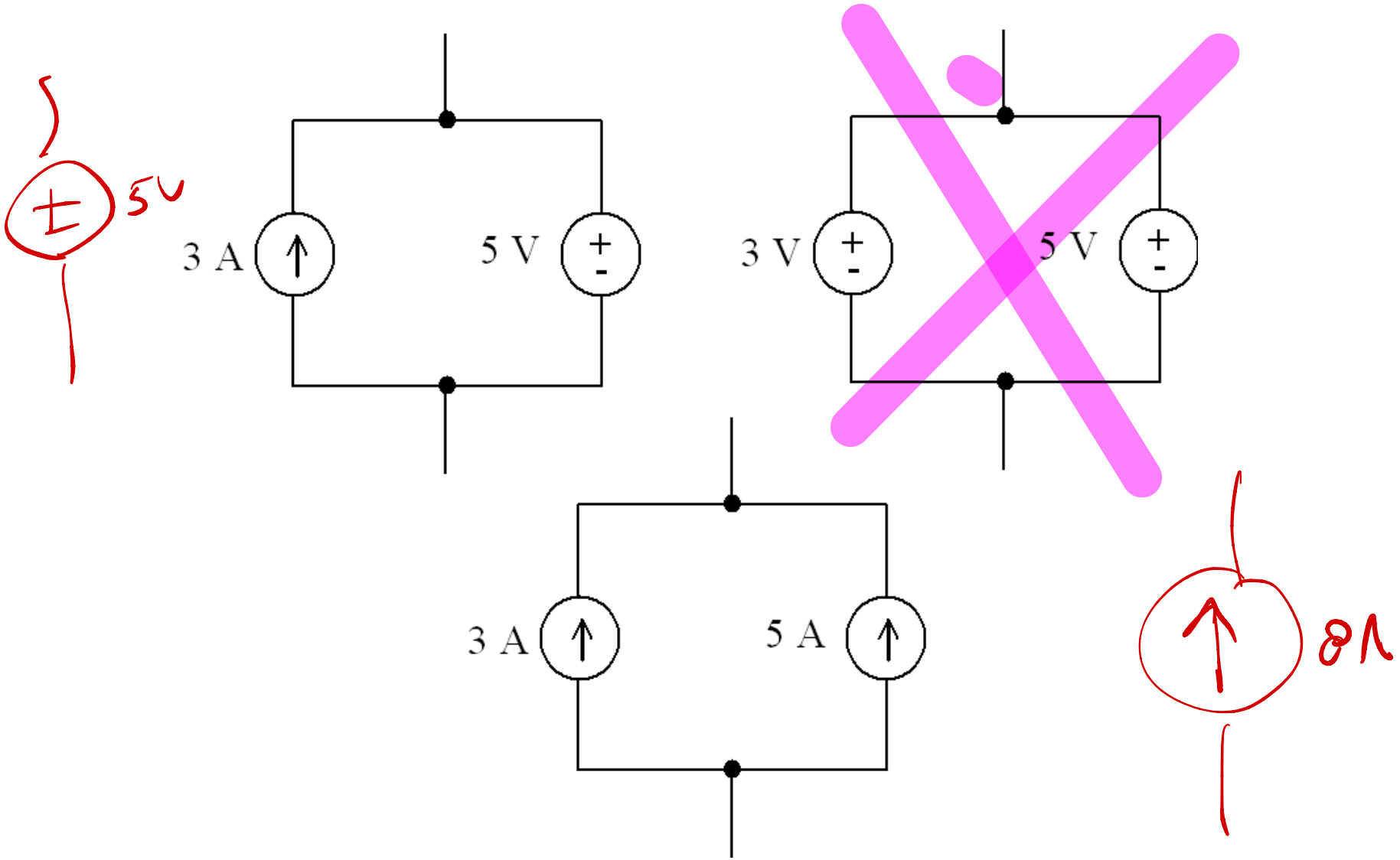
$12 = v_2$

$i = \frac{12}{2k} = 6$ mA

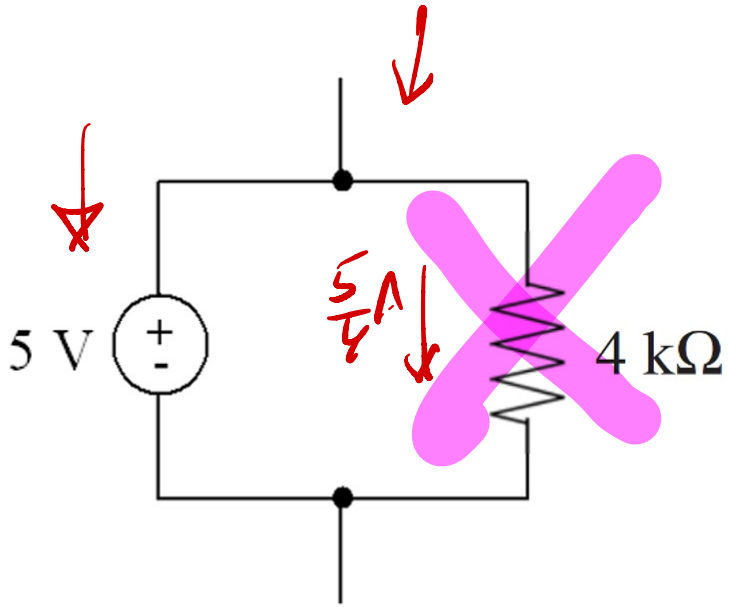
Do We Allow Series Sources?

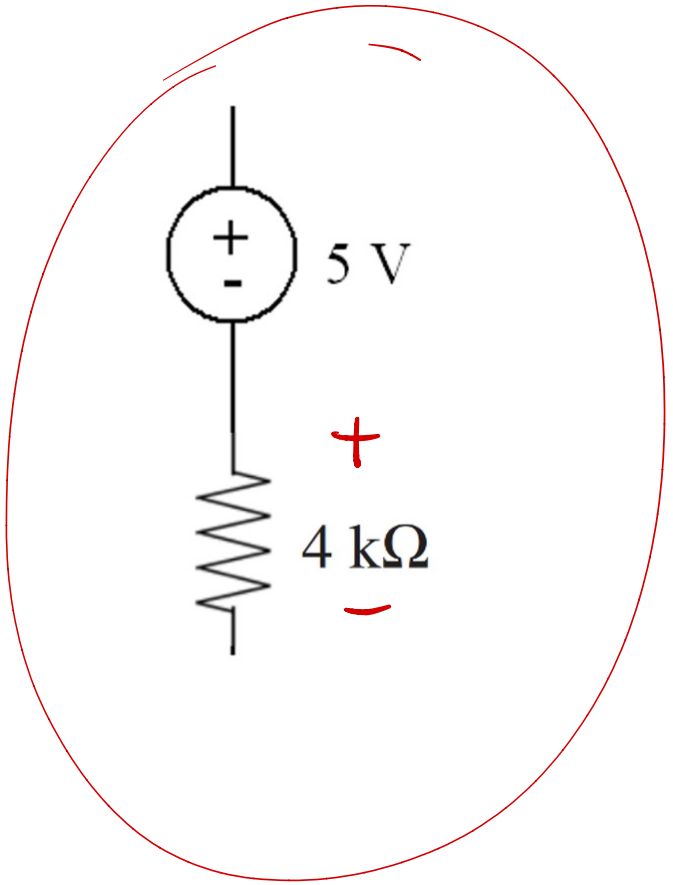


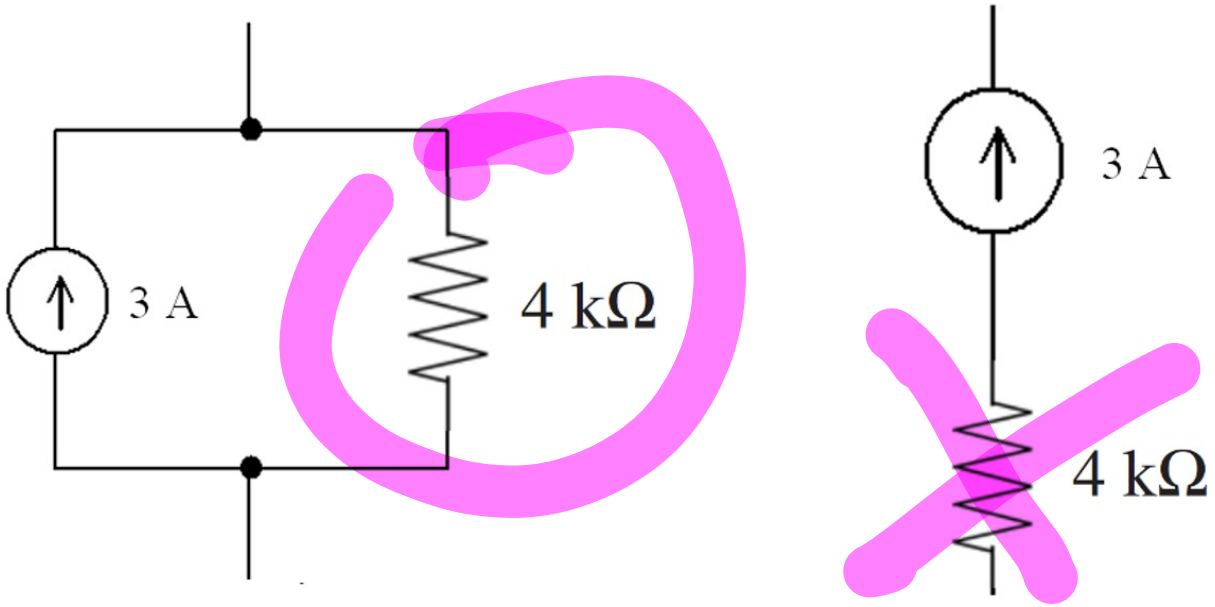
How about parallel sources?



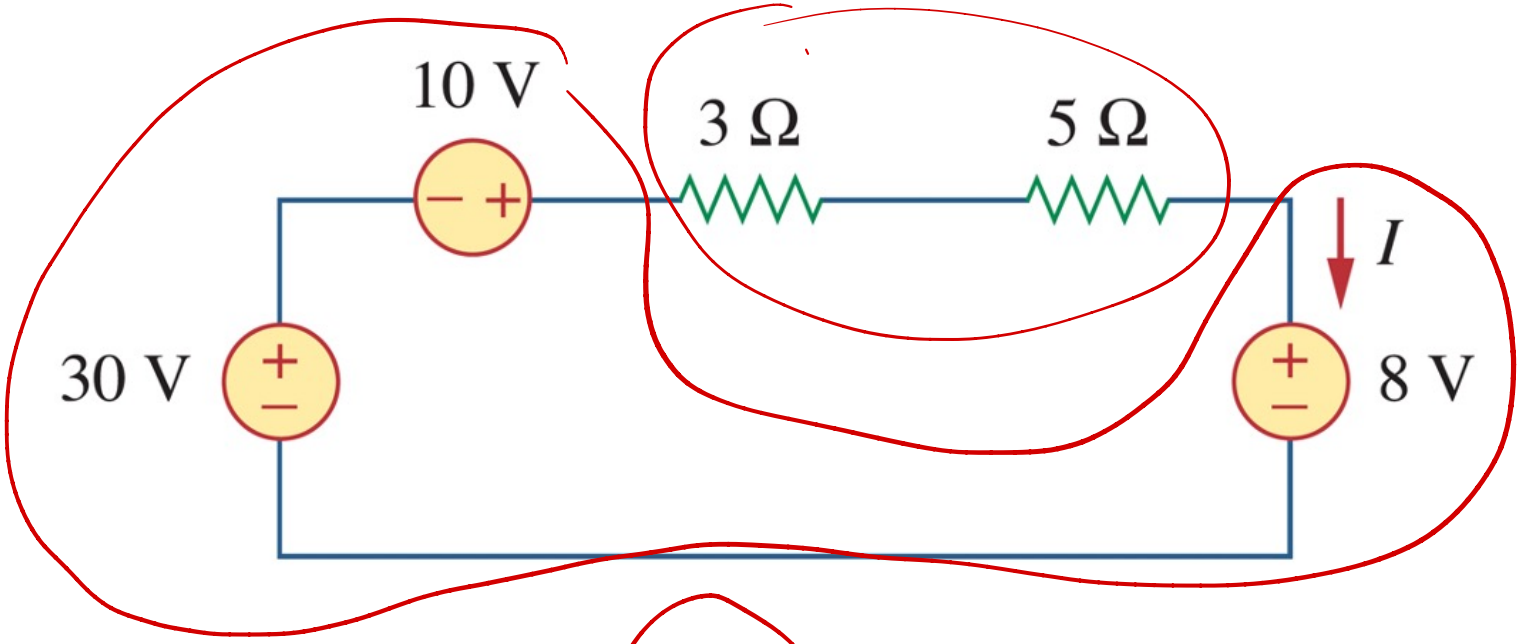
How about resistors and sources?



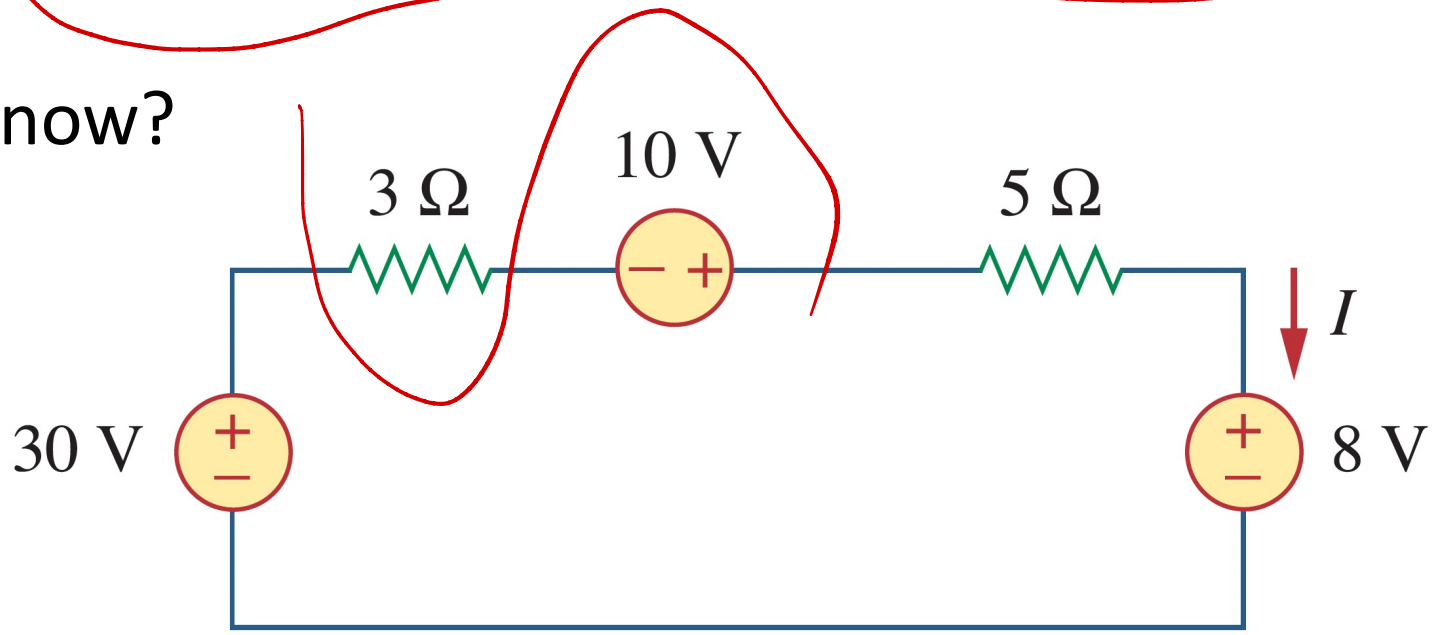



3 A
4 kΩ
3 A
4 kΩ

Example: find I

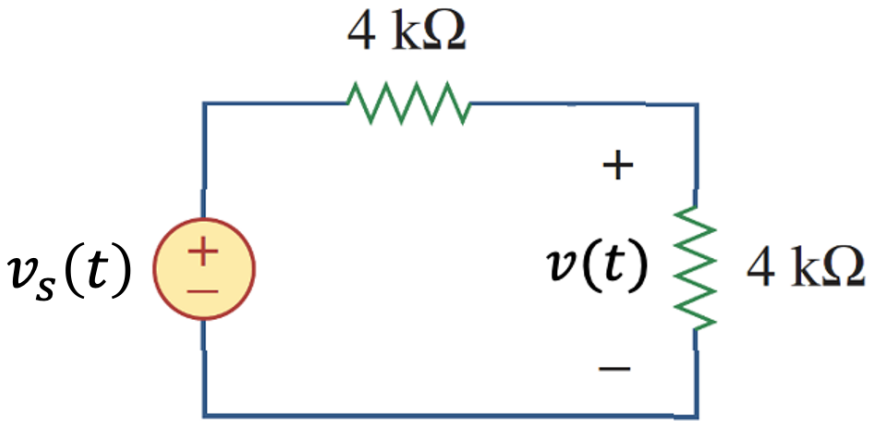


And now?



Time Varying Example

Consider this voltage division



- $v_s(t) = 12\ V$, then $v(t) = 6\ V$
- If $v_s(t)$, then ???