

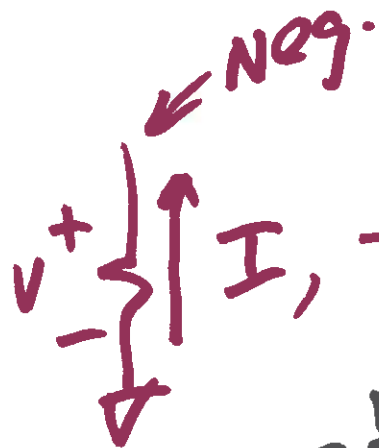
EE220 Circuits I

Lecture 4

Sept. 9, 2019

$$V_s = -\frac{3}{4}V; \frac{500}{20+1K}$$

$$V_s = -\frac{1}{4}V$$

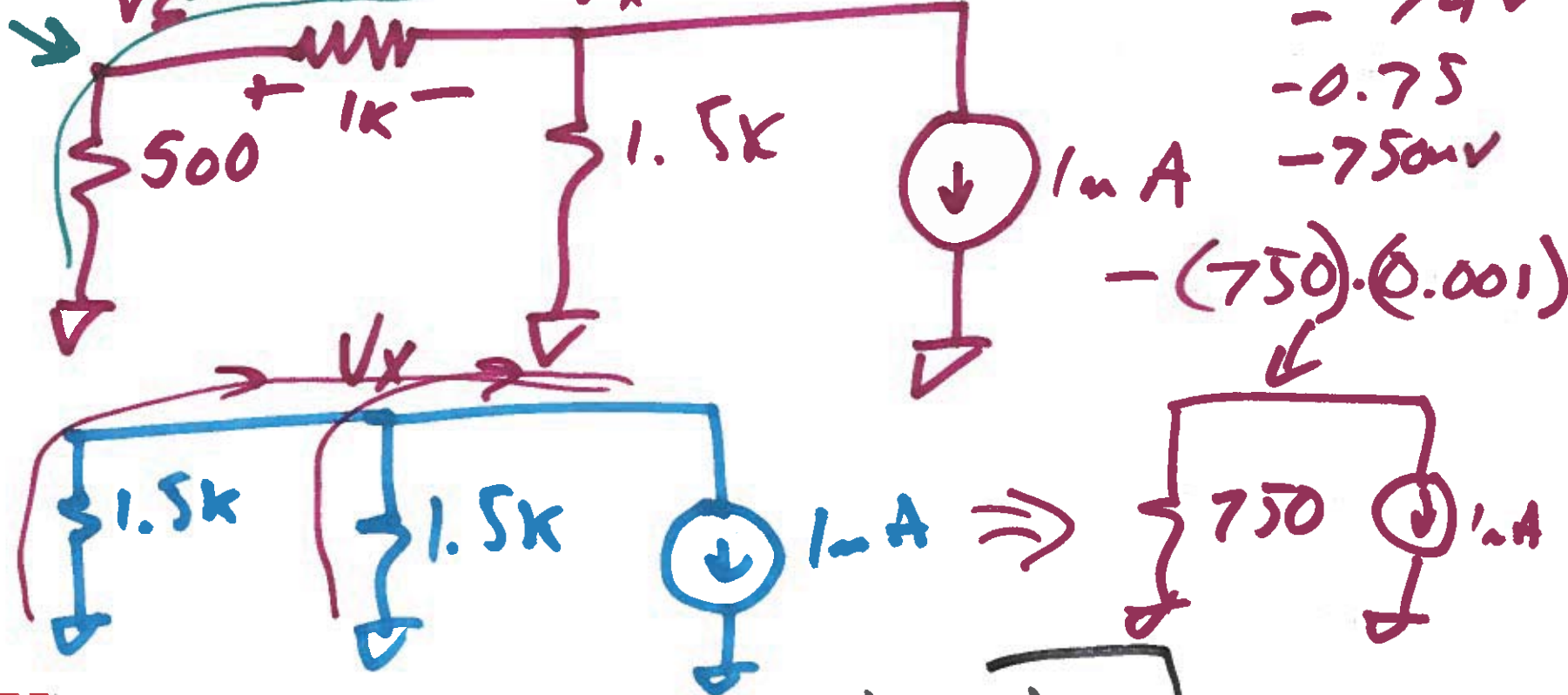


$$I, -V = IR$$

$$V = -I \cdot R$$

$$V_s = -\frac{1}{4}V$$

$$V_x = -\frac{3}{4}V$$



$$-\frac{3}{4}V$$

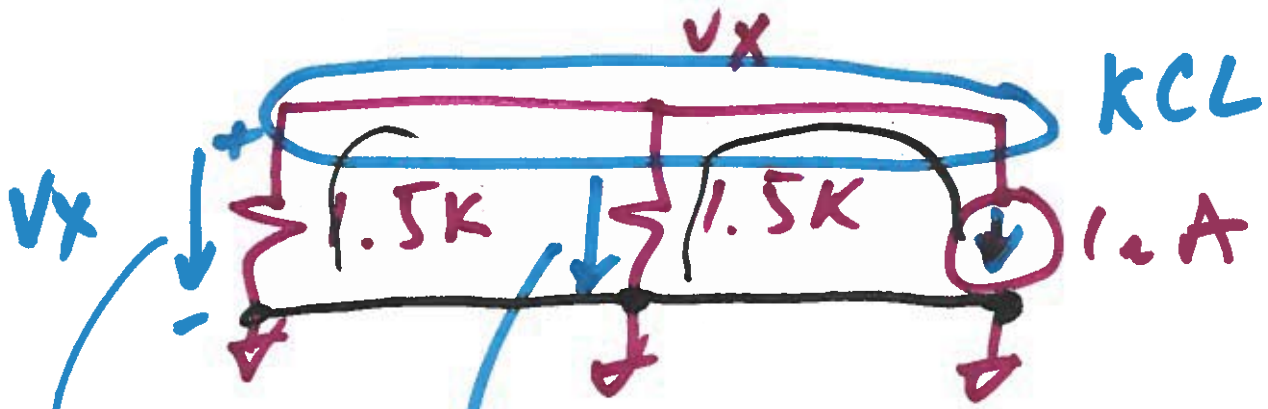
$$-0.75$$

$$-750\mu V$$

$$-(750) \cdot (0.001)$$

$$-\frac{1}{4} - \left(-\frac{3}{4}\right) = \boxed{\frac{1}{2}V}$$

1)



$$\frac{1}{R_{eq}} = \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$$

$$R_{eq} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$

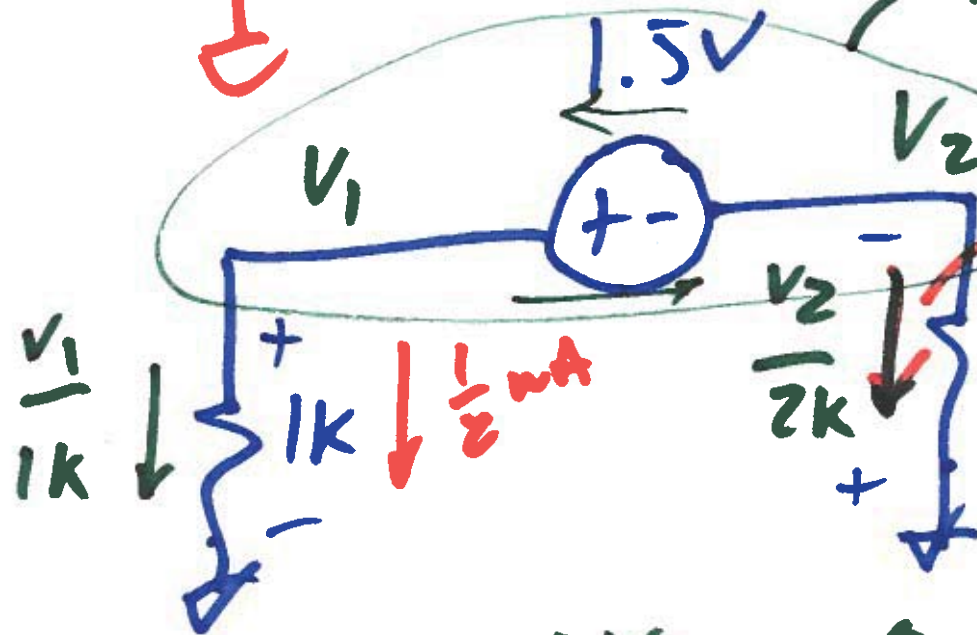
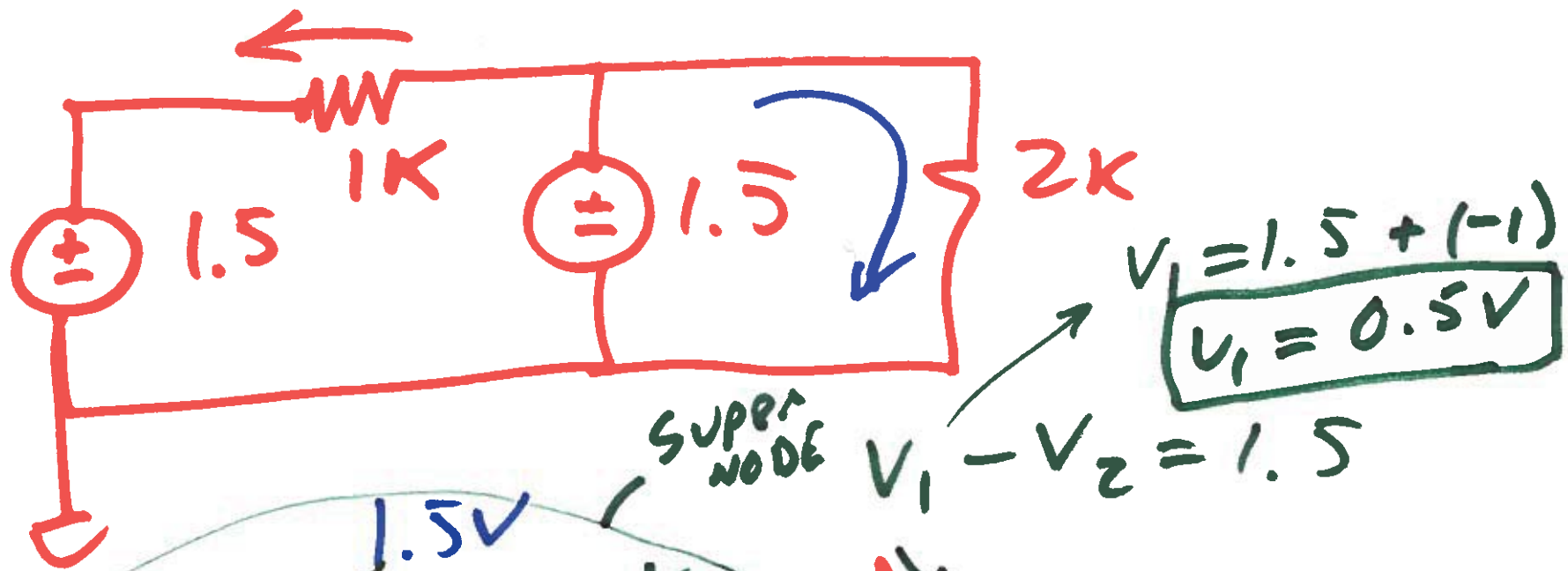
$$\frac{V_x}{1.5k} + \frac{V_x}{1.5k} + 1mA = 0$$

$$V_x = -1mA \left(\frac{1}{\frac{1}{1.5k} + \frac{1}{1.5k}} \right) = -1mA \cdot 1.5k \cdot 1.5k$$

$$= -1mA \cdot 750$$

$$= -750mV$$

2)



$$\frac{V_1}{1k} + \frac{V_2}{2k} = 0$$

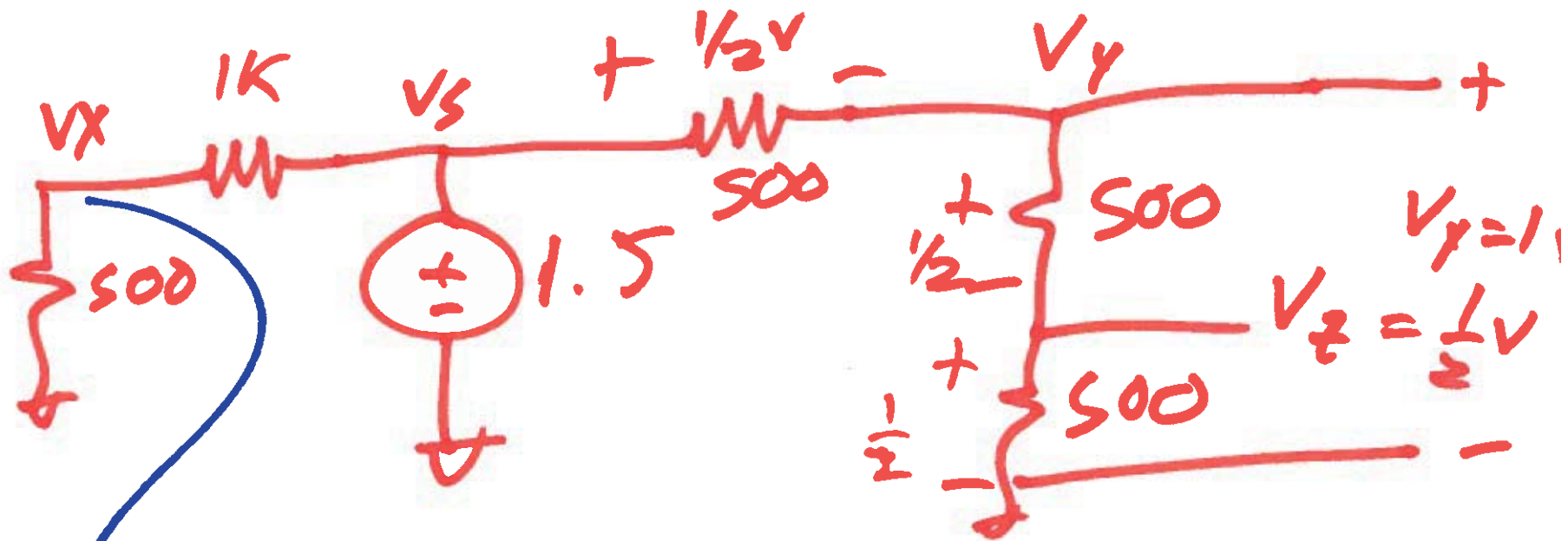
$$2k \left(\frac{1.5 + V_2}{1k} + \frac{V_2}{2k} \right) = (0)_{2k}$$

$$3 + 3V_2 = 0$$

$$V_2 = -1V$$

$$3 + 2V_2 + V_2 = 0$$

3)

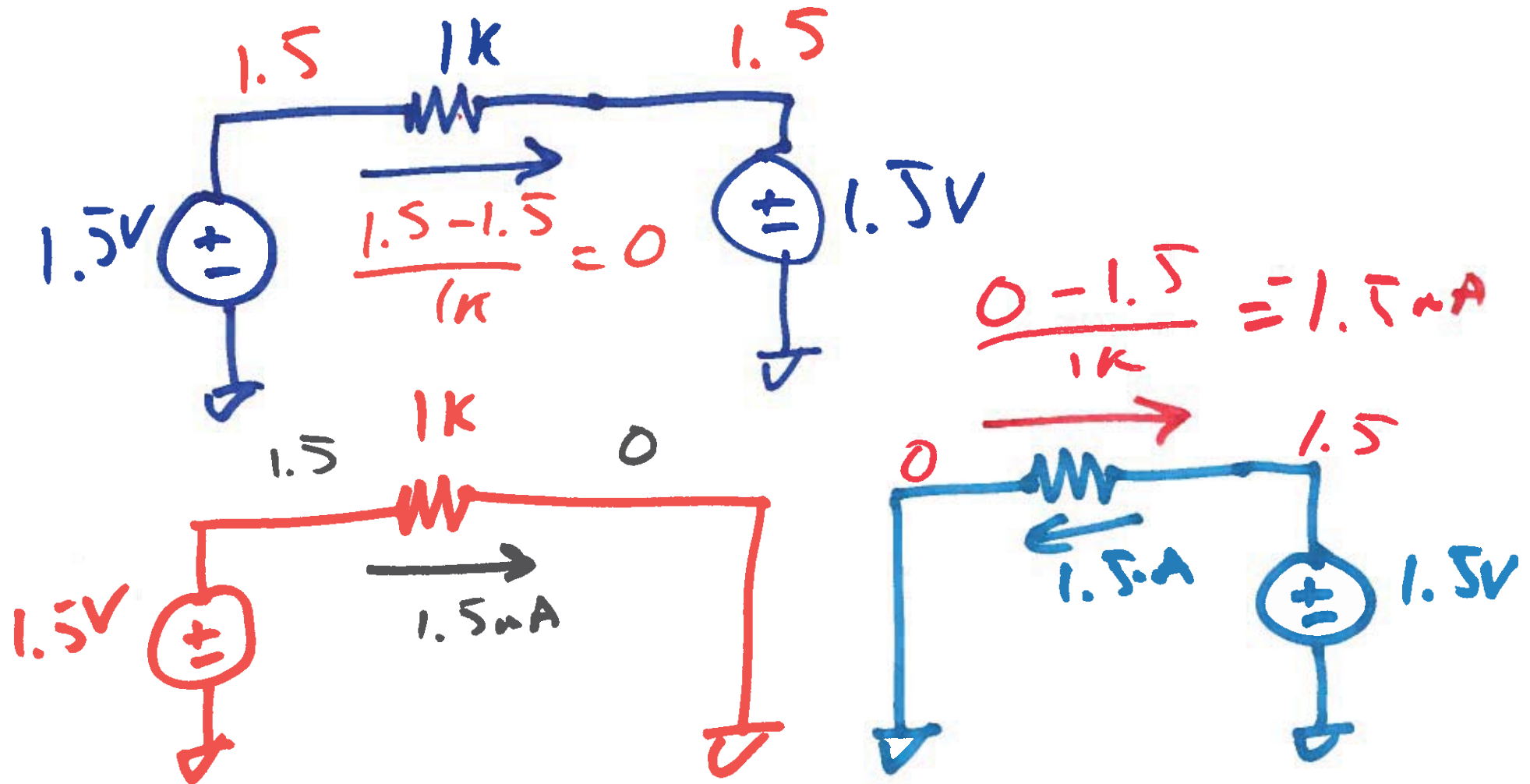


$$V_x = 1.5 \cdot \frac{500}{500 + 1k} = 1.5 \cdot \frac{1}{3} = 0.5V$$

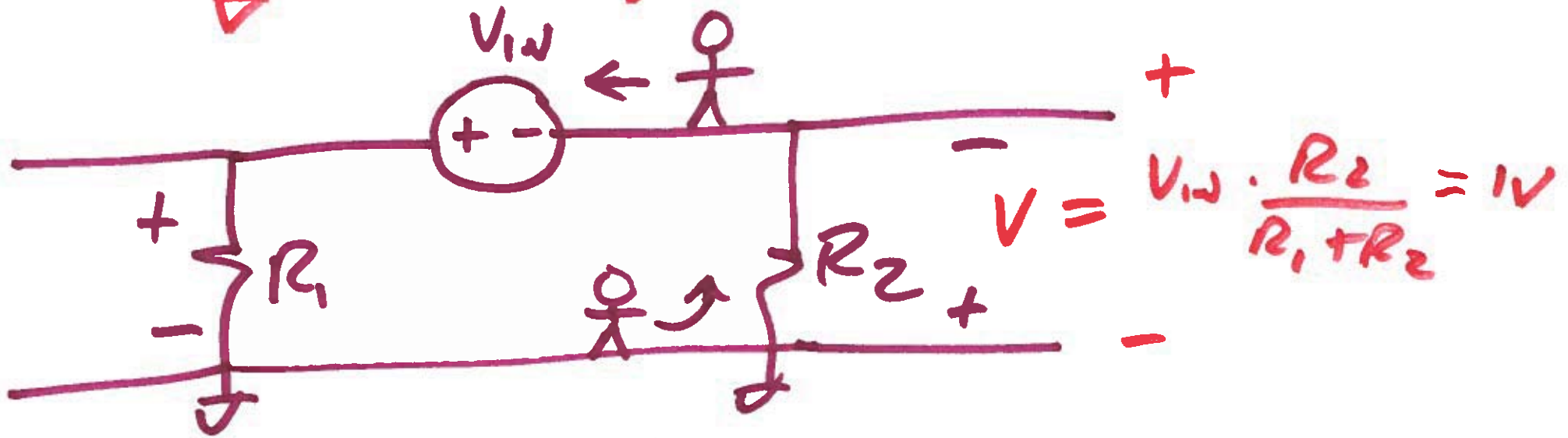
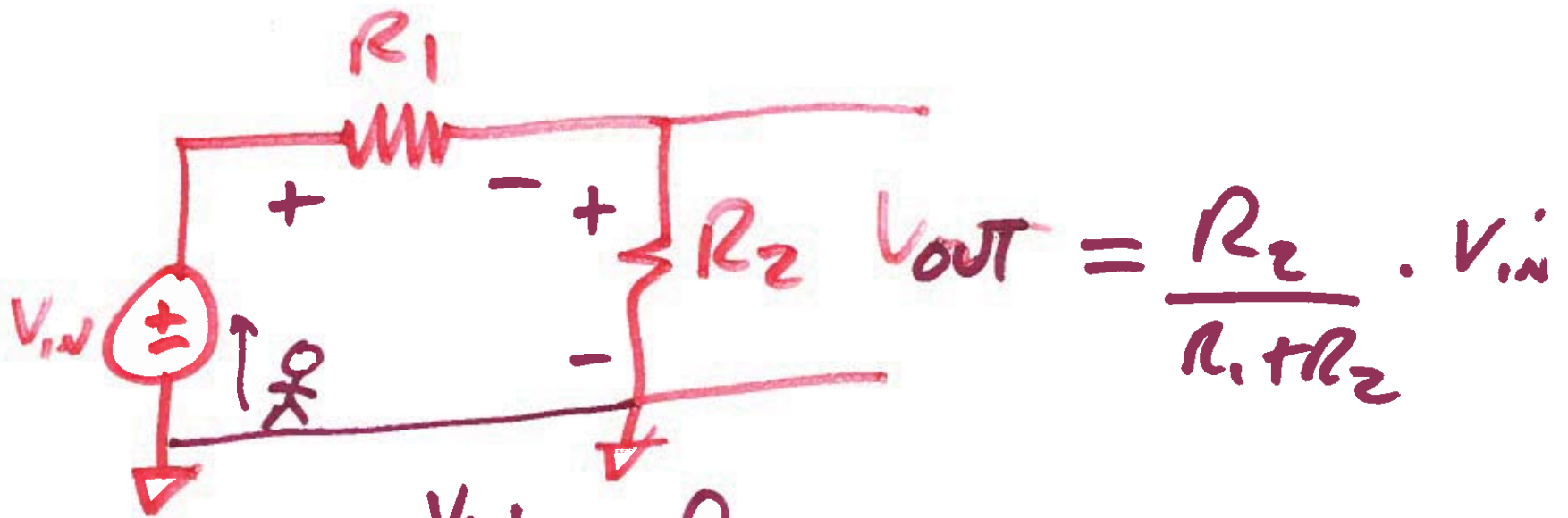
$$V_z = 1.5 \cdot \frac{500}{500 + 500 + 500} = \frac{1}{2}V$$

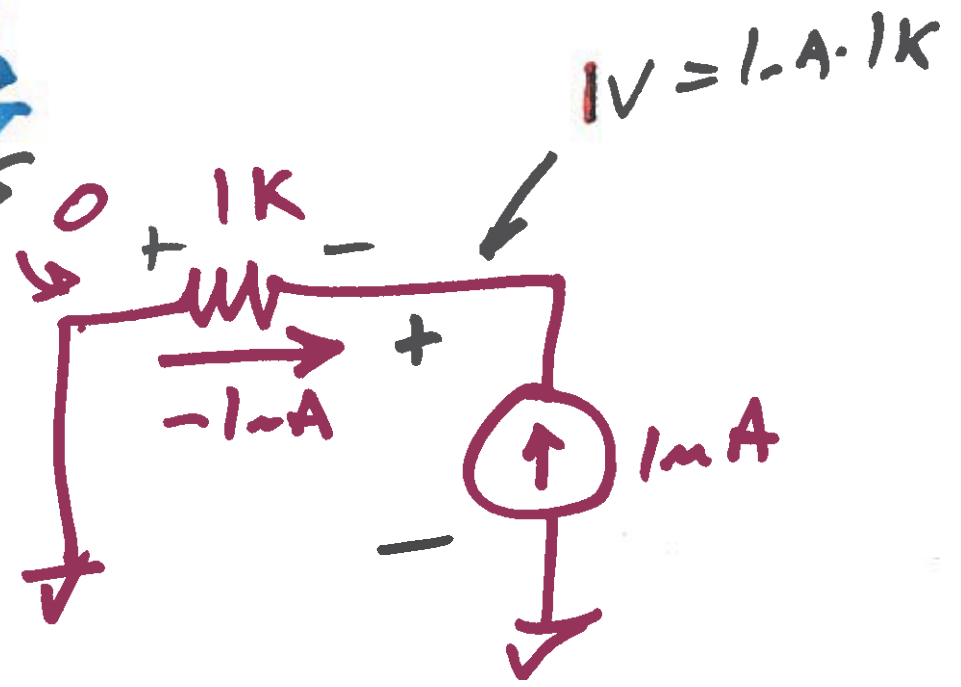
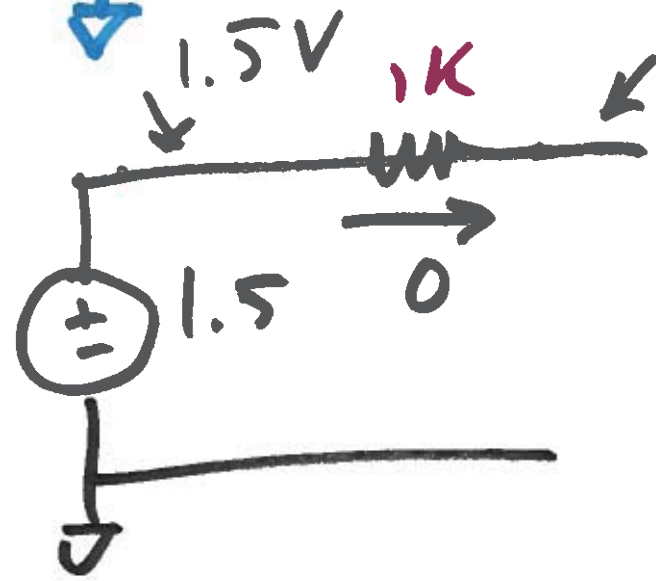
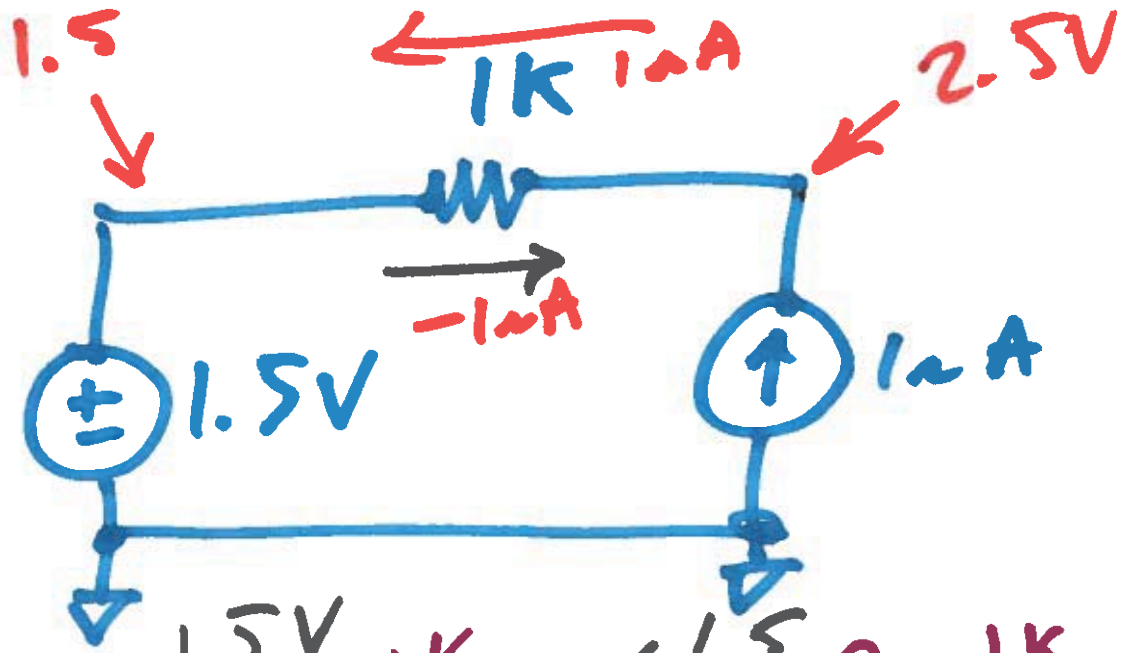
4)

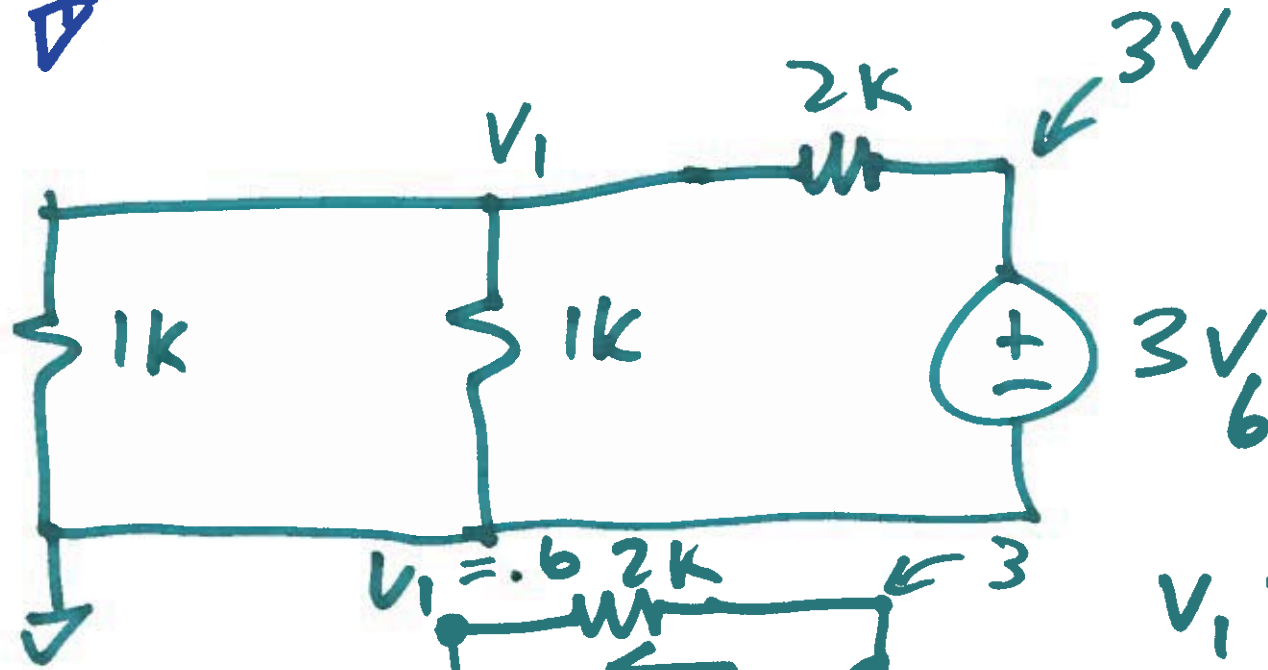
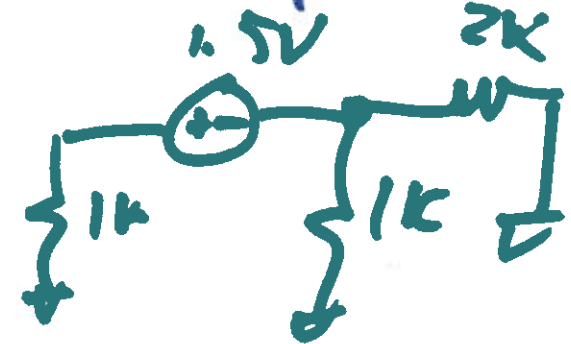
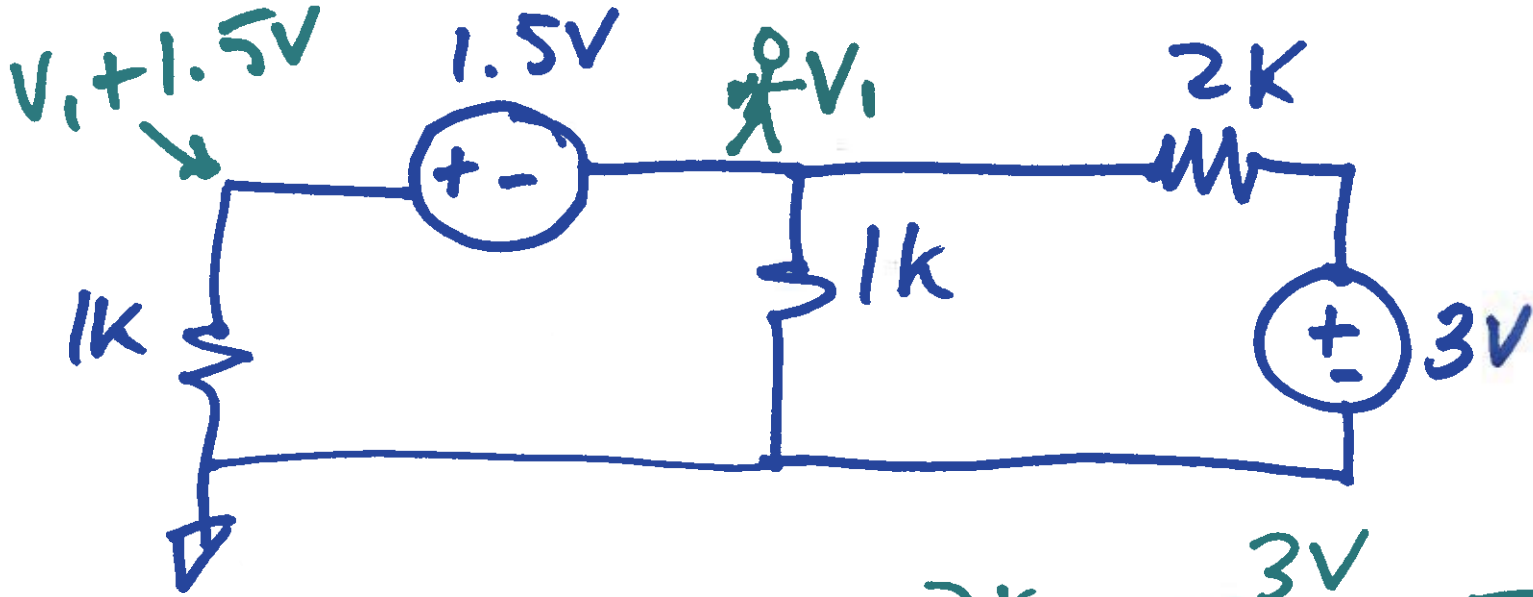
Superposition



5)







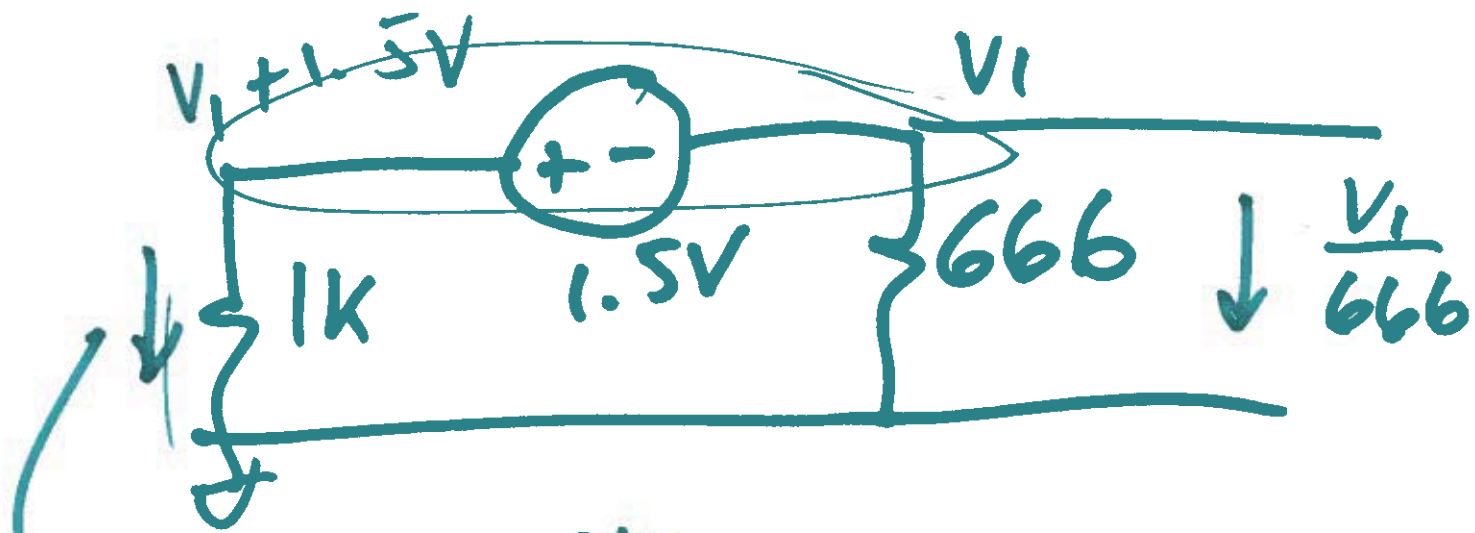
$$666\Omega = \frac{2k \cdot 1k}{2k + 1k} = \frac{2000}{3} = 666\Omega$$

$$V_1 = 3 \cdot \frac{500}{500 + 2k} = \frac{3 \cdot 500}{2500} = \frac{3 \cdot 5}{25} = \frac{3}{5}$$

$$\frac{3 - .6}{2k} = \frac{2.4}{2k} = 1.2mA$$

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8)



$$\frac{V_1 + 1.5V}{1k} + \frac{V_1}{666} = 0$$