

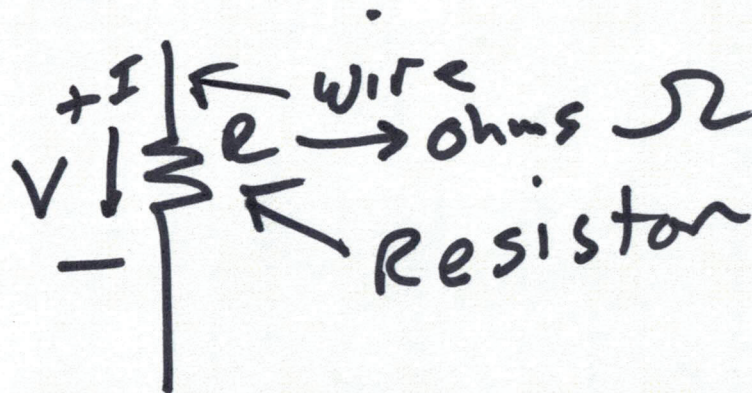
EE 220

CIRCUITS I

August 28, 2023

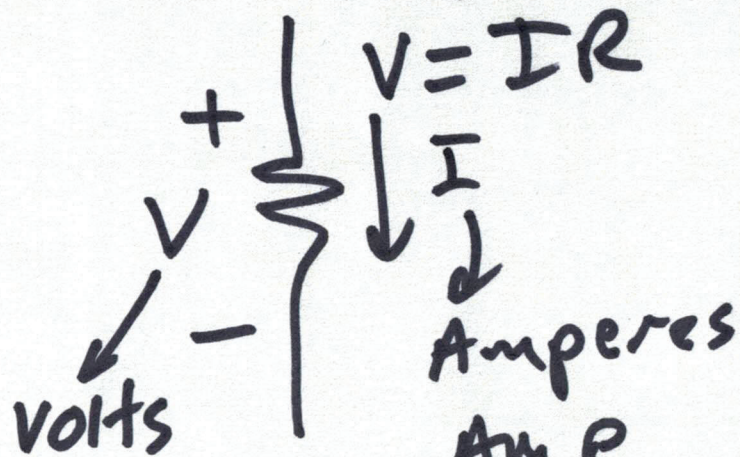
Lecture 1

ohm's law

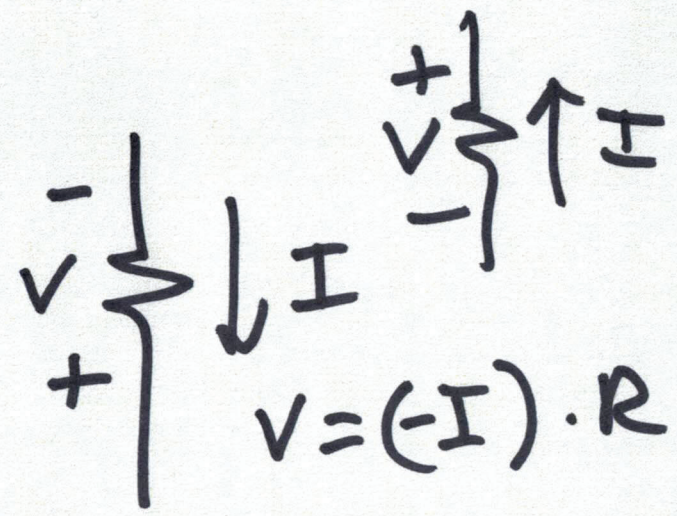


$$V = IR \text{ ohm's law}$$

Ohm's law



$$V = IR$$

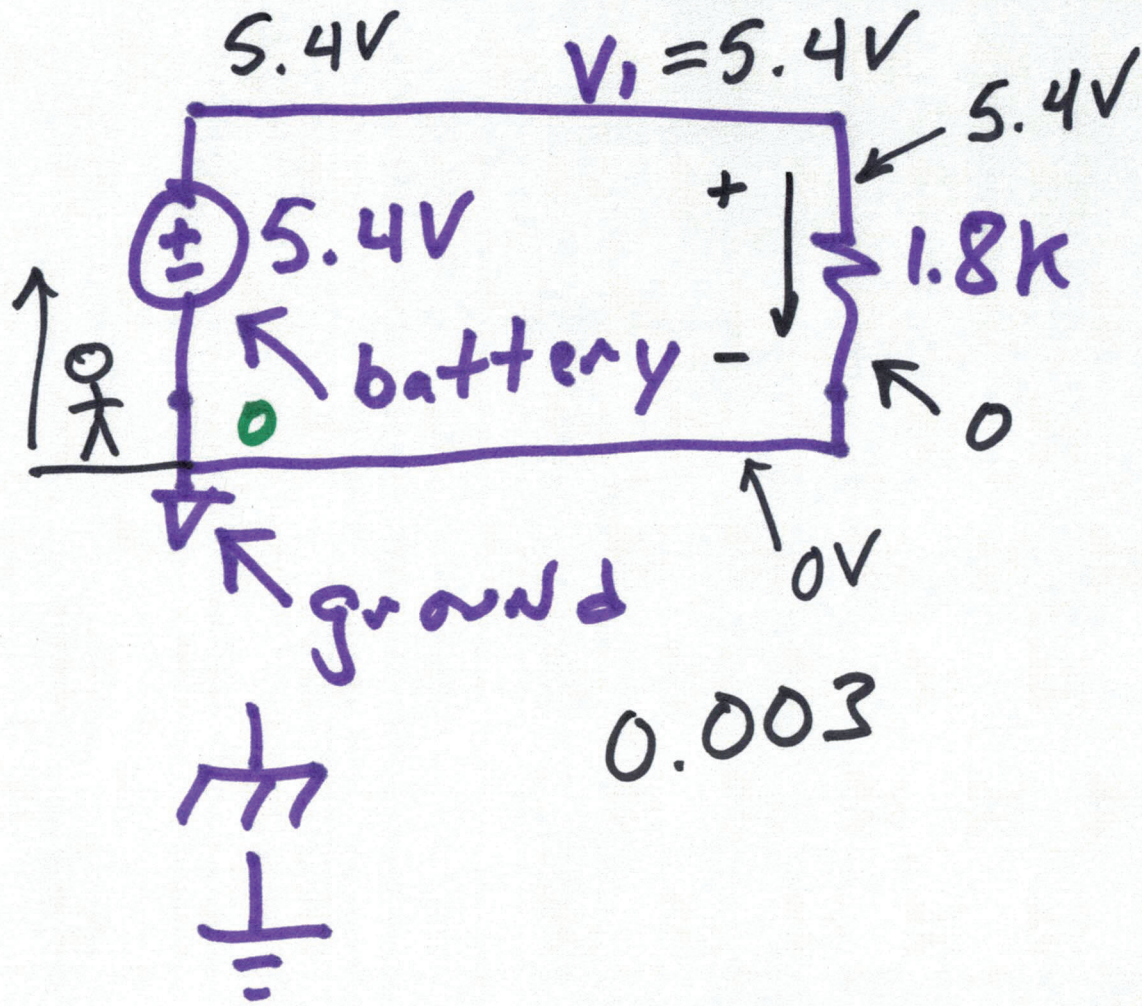


$$V = (-I) \cdot R$$

$$\frac{\text{Coulombs}}{\text{S}} = \text{Amps} = A$$

$$e = 1.6 \times 10^{-19} C$$

2)



$$V = I \cdot R$$

$$V = I \cdot 1.8k\Omega$$

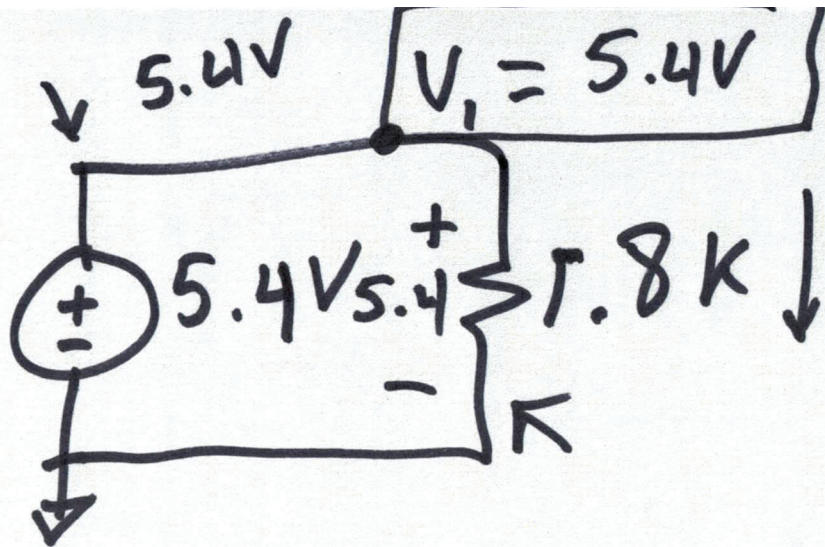
$$5.4V = I \cdot 1.8k$$

$$I = \frac{5.4}{1.8k\Omega}$$

$$= \frac{5.4}{1800} = \frac{5.4}{1.8 \times 10^3} A$$

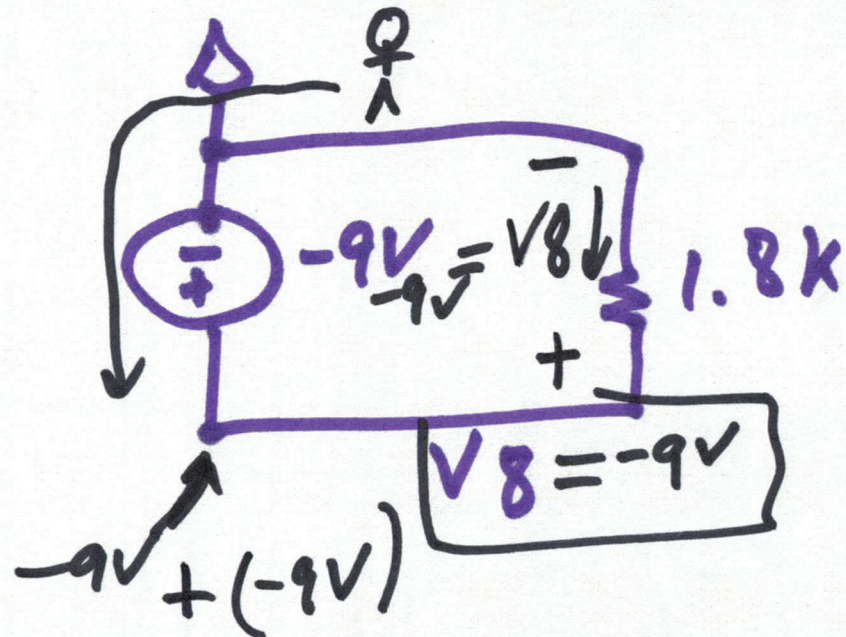
$$= \frac{5.4}{1.8} \cdot 10^{-3} = 3mA$$

↑ milli = m



$$I = \frac{V}{R} = \frac{5.4}{1.8k} = 3 \mu A$$

Ohm's law



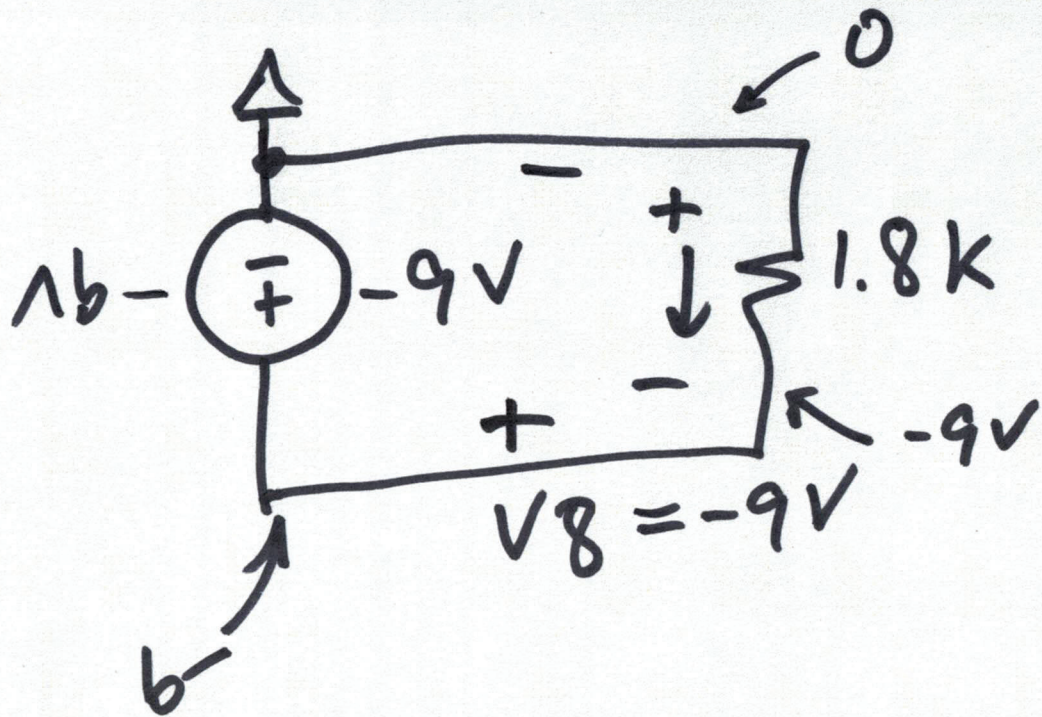
$$V = -I \cdot R$$

$$I = -\frac{V}{R}$$

$$= -\frac{(-9)}{1.8k}$$

$$= 5 \mu A$$

4)



$$\downarrow \int \overset{+}{v} = IR$$

$$0 - (-9) = \frac{I \cdot 1.8k}{9}$$

$$I = \frac{9}{1.8k}$$

$$= 5 \mu A$$

$$\uparrow \int \overset{+}{v} = -I \cdot R$$

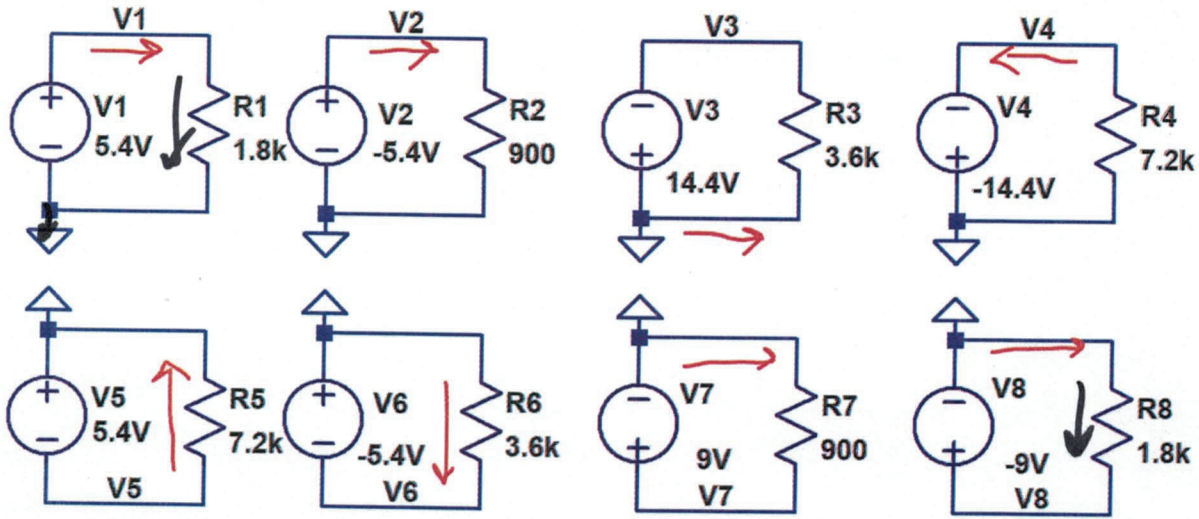
5)

Jart

H.W. #1 EE 220 Fall 2023

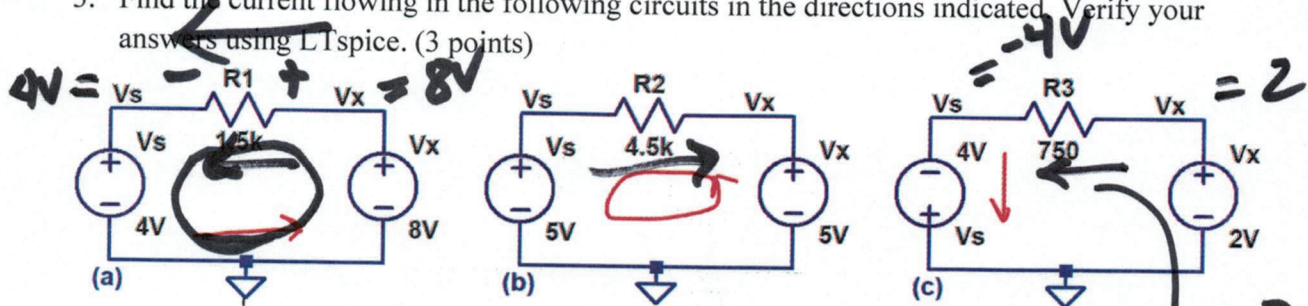
Show your work for credit and put a box around each of your answers!

1. What are V1-V8, in each of the following circuits? It's okay to simply write your answer next to each circuit schematic. (0.5 points each)

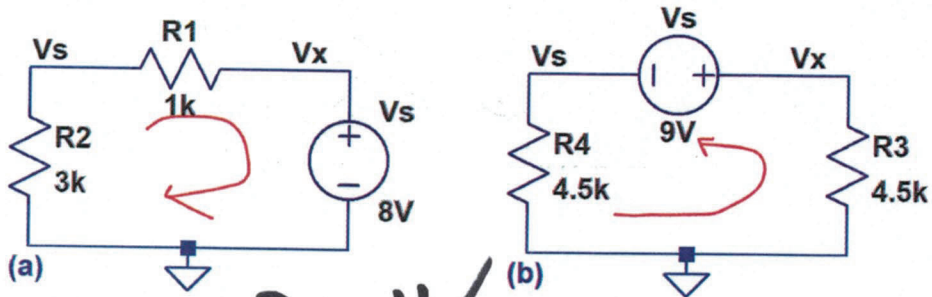


2. What is the current flowing in the preceding circuits? Give answers for the current flowing in the directions indicated on each schematic. (0.5 points each)

3. Find the current flowing in the following circuits in the directions indicated. Verify your answers using LTspice. (3 points)

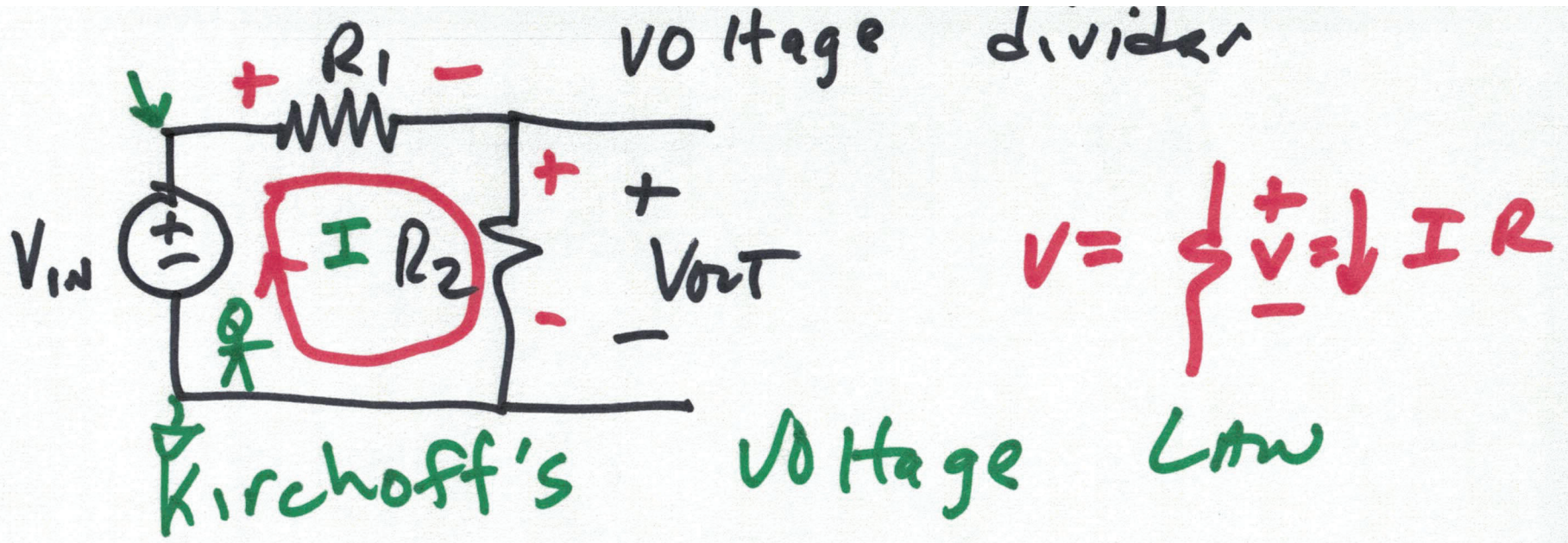


4. Find the voltages  $V_s$ ,  $V_x$ , and the voltages across all resistors. Find the current flowing in each circuit. Verify your answers with LTspice. (4 points)



$$I = \frac{8V - 4V}{1.5k}$$

6)



$$+V_{in} - I \cdot R_1 - I R_2 = 0$$

$$I = \frac{V_{in}}{R_1 + R_2}$$

$$V_{out} = I \cdot R_2 = V_{in} \cdot \frac{R_2}{R_1 + R_2}$$

voltage divider