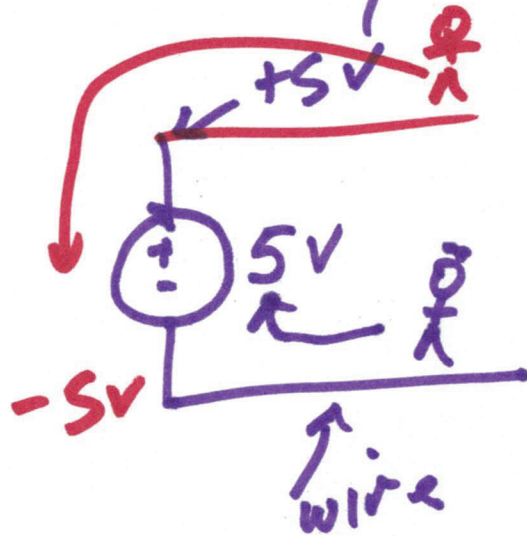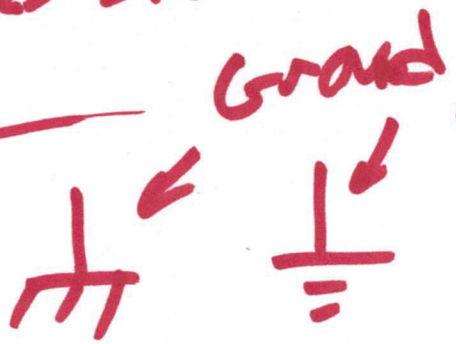# EE 220 Circuits I
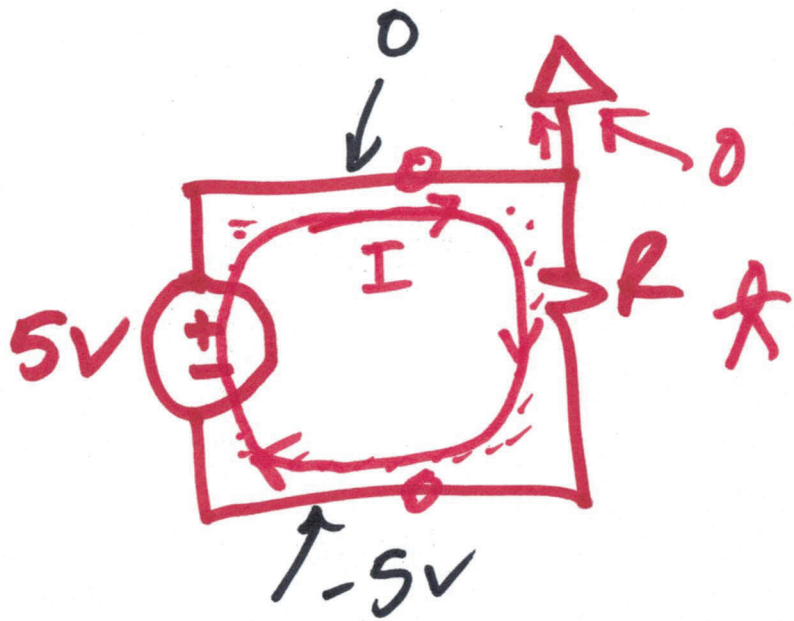
Lecture 1

8/23/2021

+5V

5V

-5V

wire

8ff

1)

5   ↙ +5v

5v   ±

Red + meter

R, √R ← ohms

resistor

0

0v

0

Ground

Symbols

0

0

I

5v   ±

R   人

↑ -5v

GFCI

2)

Ohm's law

$$V = I \cdot R$$

5V

$$\vec{I_x} = -I$$

3)

5V

5V

5V

5V

+
1K
−

0

0

0

NODE

$V = IR$

$5 - 0 = 5V$

$5V = I \cdot 1K\Omega$

$\quad\quad\quad 1000$

$I = \dfrac{5}{1000}$

$\boxed{I = 5m A}$

5V ± OPEN CIRCUIT CKT

$I \downarrow \underset{R}{\lessgtr} \overset{+}{\underset{-}{V}} = IR$
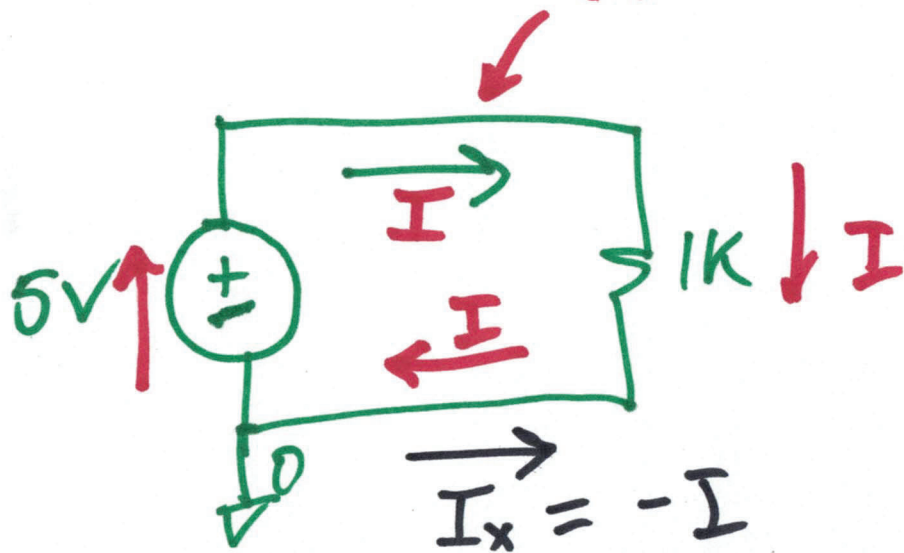
4)
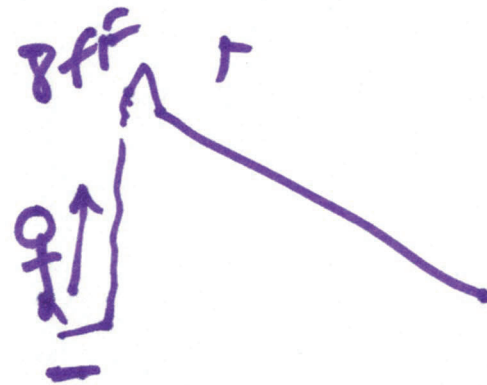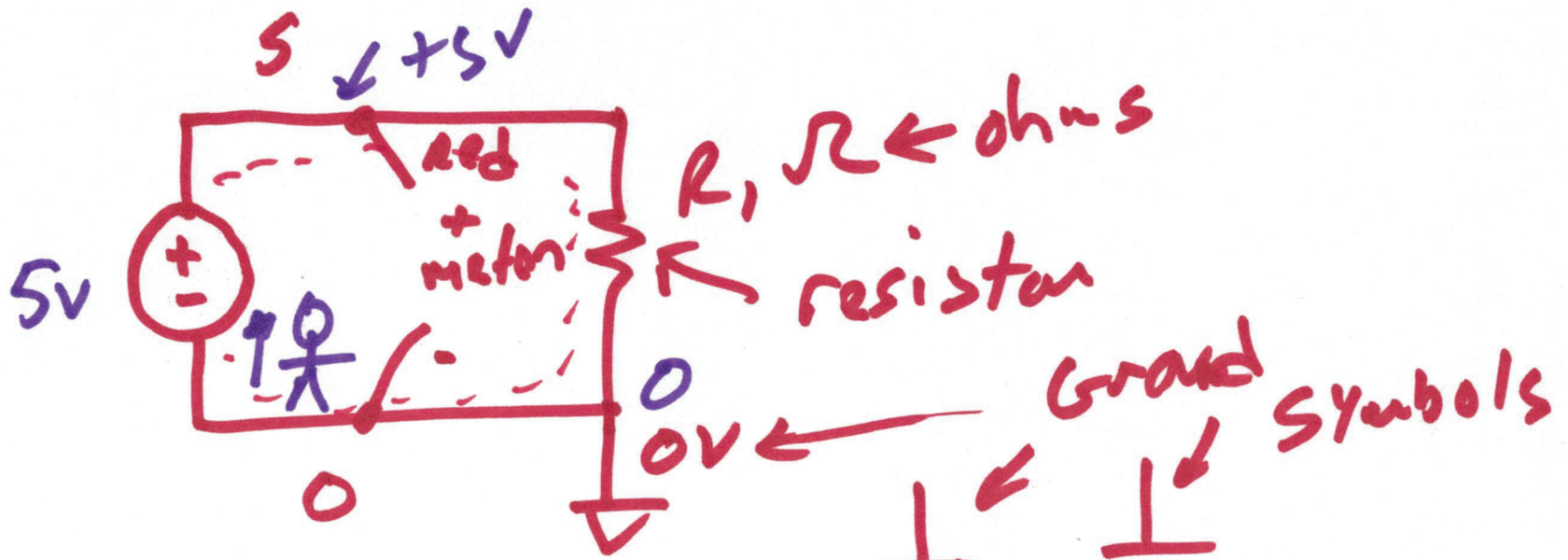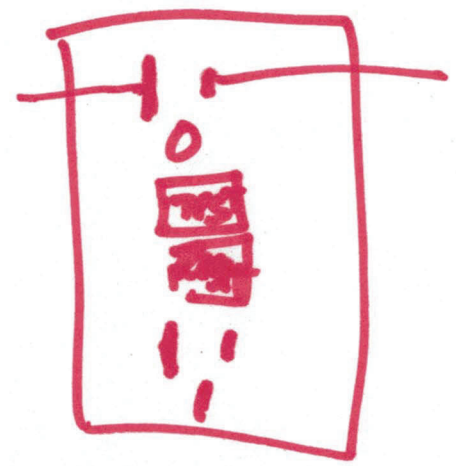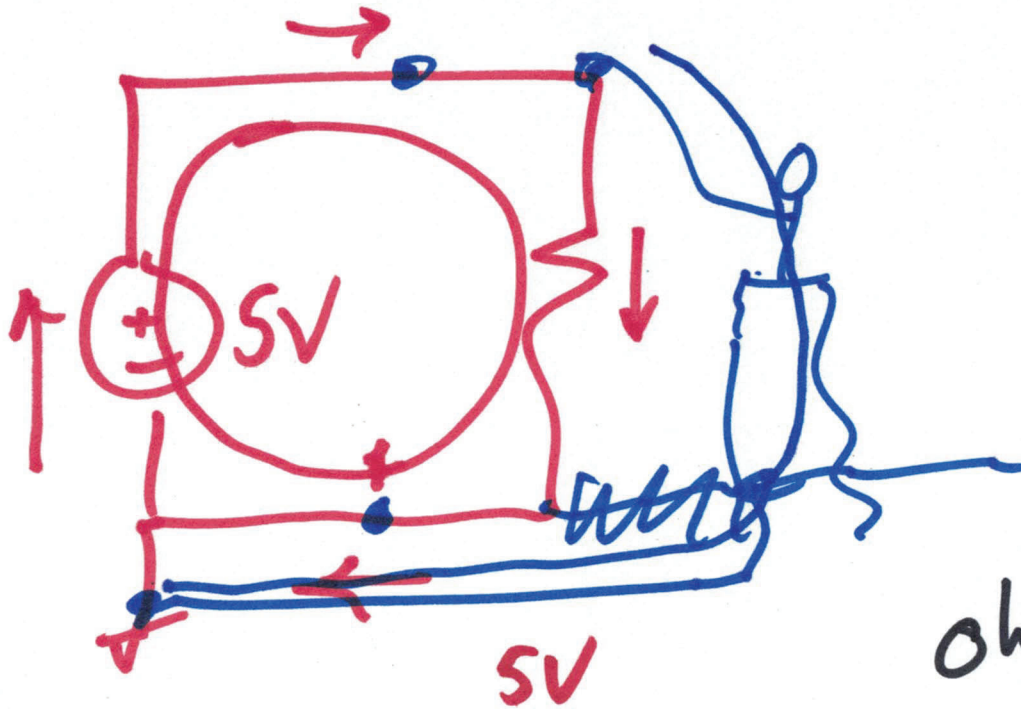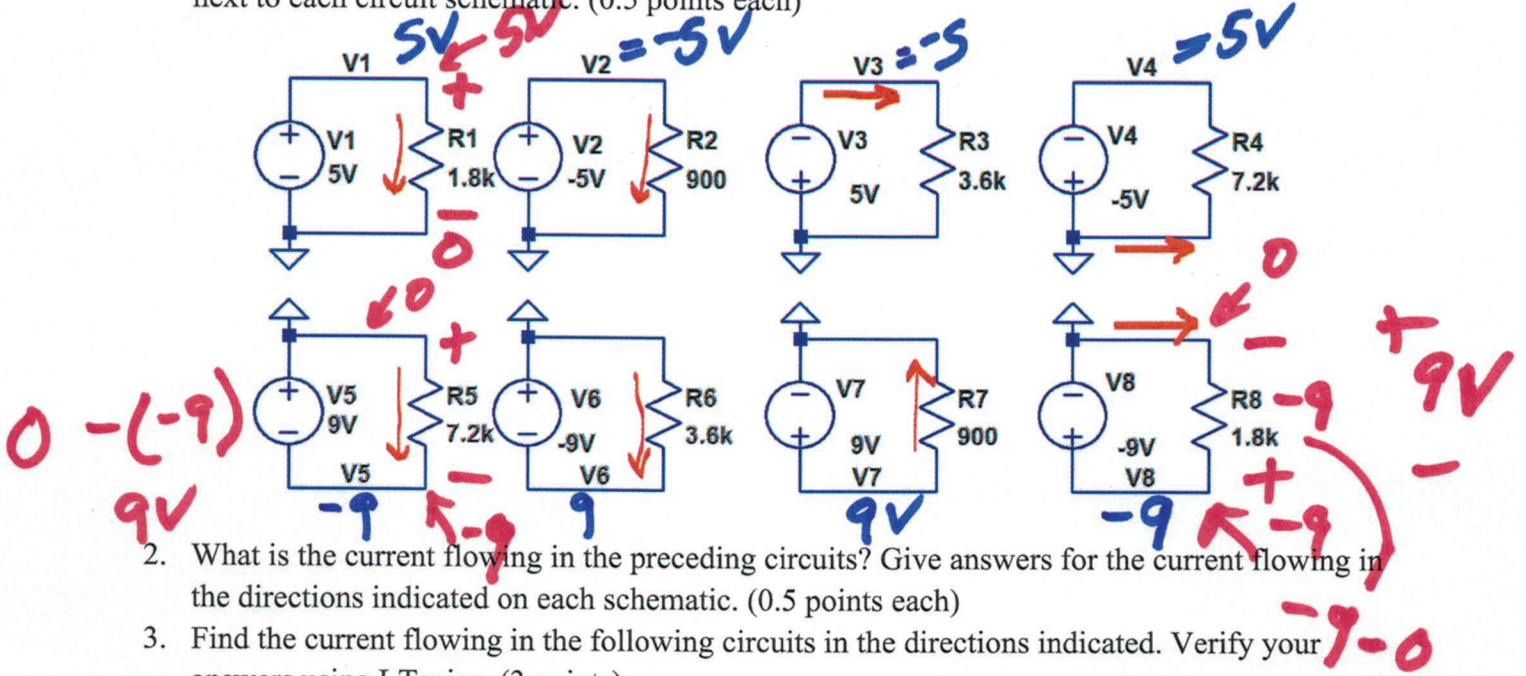
H.W. #1 EE 220 Fall 2021

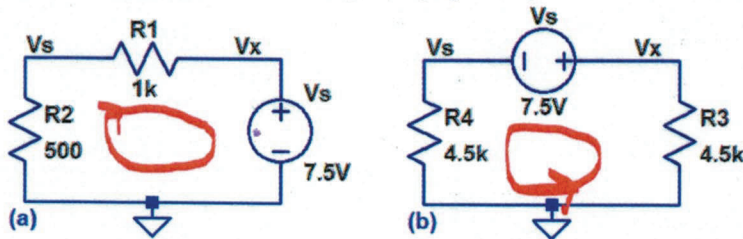Show your work for credit and put a box around each of your answers!

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)

V1 $5V \leftarrow 5V$ V2 = $-5V$ V3 = -5 V4 = $5V$

V1 5V   R1 1.8k   V2 -5V   R2 900   V3 5V   R3 3.6k   V4 -5V   R4 7.2k

0   0

$0 - (-9)$ V5 9V   R5 7.2k   V6 -9V   R6 3.6k   V7 9V   R7 900   V8 -9V   R8 1.8k -9 $9V$

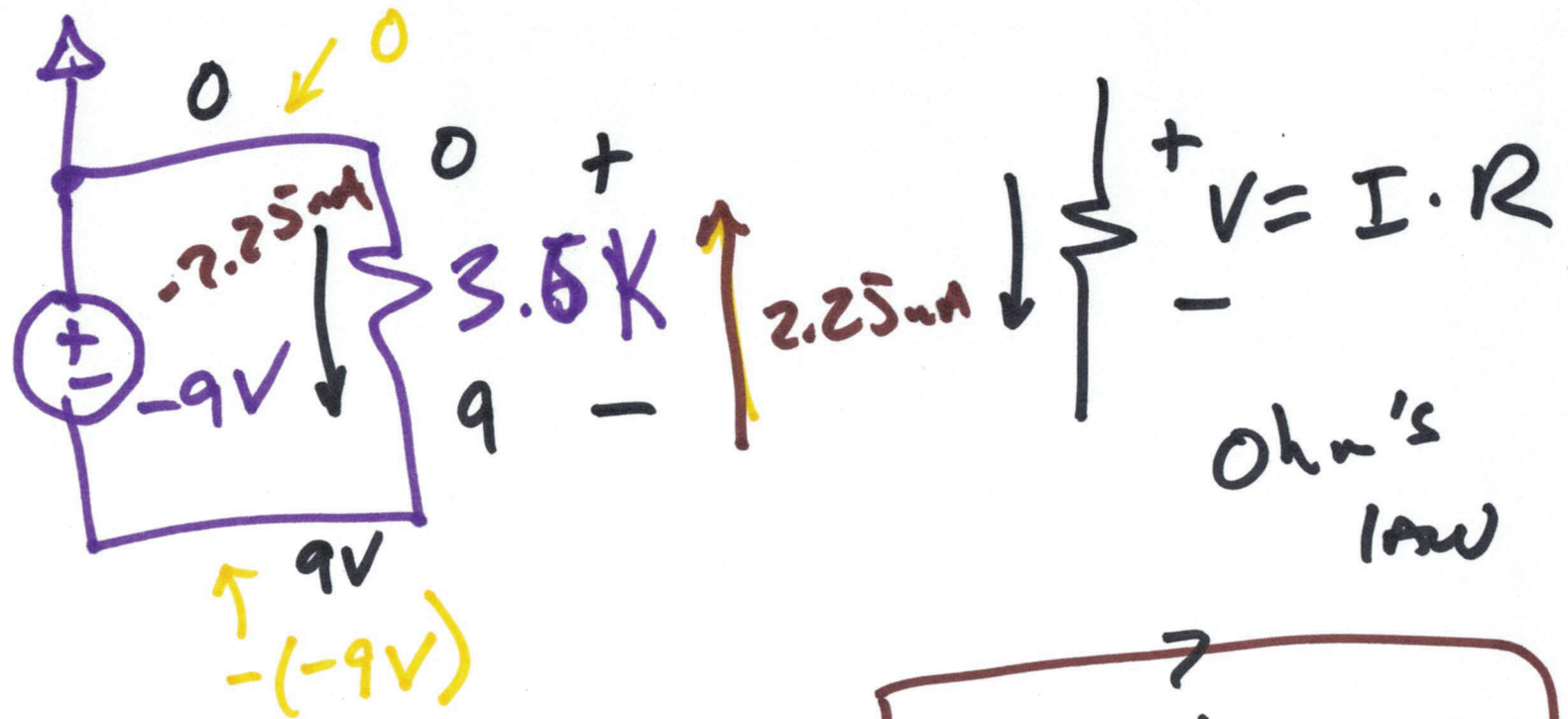$9v$ -9 V5   V6 9 V7 $9v$ V8 -9 -9 -9

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)

$-9-0$

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

(a) Vs — R1 1.5k — Vx; Vs 4V; Vx 8V

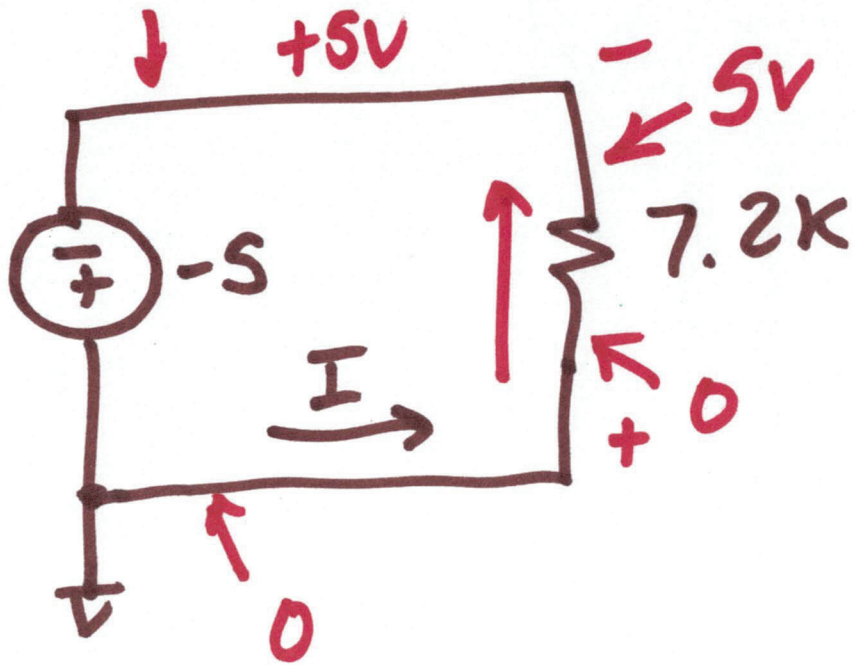(b) Vs — R2 4.5k — Vx; Vs 3V; Vx 3V

(c) Vs — R3 750 — Vx; 9V; Vs; Vx 3V
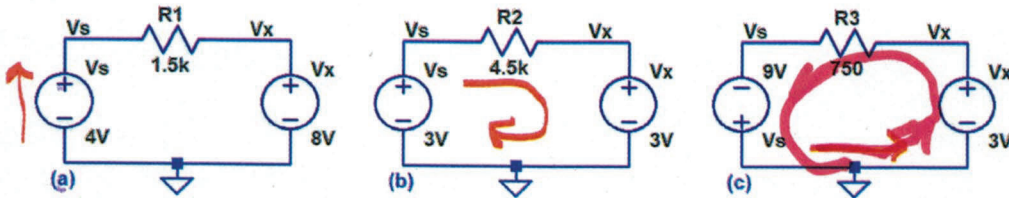
4. Find the voltages Vs, Vx, and the voltages across all resistors. Find the current flowing in each circuit. Verify your answers with LTspice. (4 points)
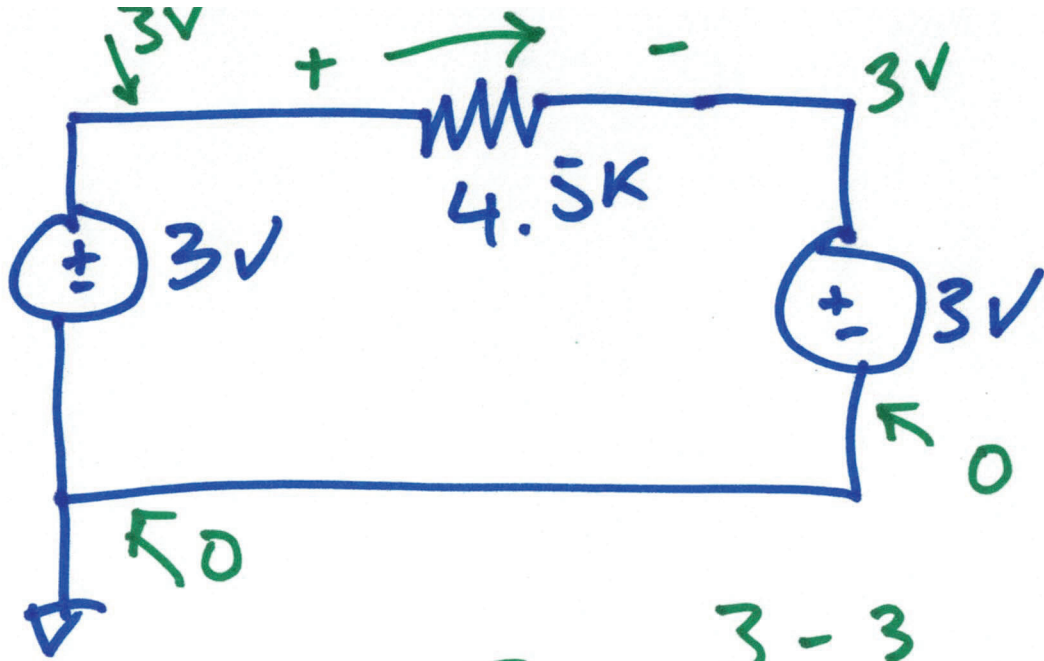
(a) Vs — R1 1k — Vx; R2 500; Vs 7.5V

(b) Vs — Vs(source) — Vx; R4 4.5k; 7.5V; R3 4.5k

$5)$

0   ↓ 0

0   +

0   3.6K   ↑ 2.25mA   + V = I·R

9   −   −

-2.25mA

-9V

↑ 9V
-(-9V)

Ohm's
law

$$I = \frac{0-9}{3.6K} = \boxed{-2.25\,mA = I}$$

6)

$$V = IR$$

$$I = \frac{0 - 5}{7.2K}$$

$$I = -.69\sim A$$

3V

$+$ → $-$

4.5K

3V

3V

3V

0

0

$I \downarrow \overset{+}{\underset{R}{\lessgtr}} \underset{-}{V} = IR$

$I = \dfrac{3-3}{4.5K} = \boxed{0 = I}$

8)

$$I = \frac{3 - 9}{750}$$

9)

$$7.5V$$

$$V_S \qquad V_S \qquad \qquad V_X \quad V_X \quad V_X - V_S = 7.5V$$

$$1r$$

$$4.5K \qquad I \qquad \quad {}^+_V \;\; 4.5K$$

$$-$$

$$0$$
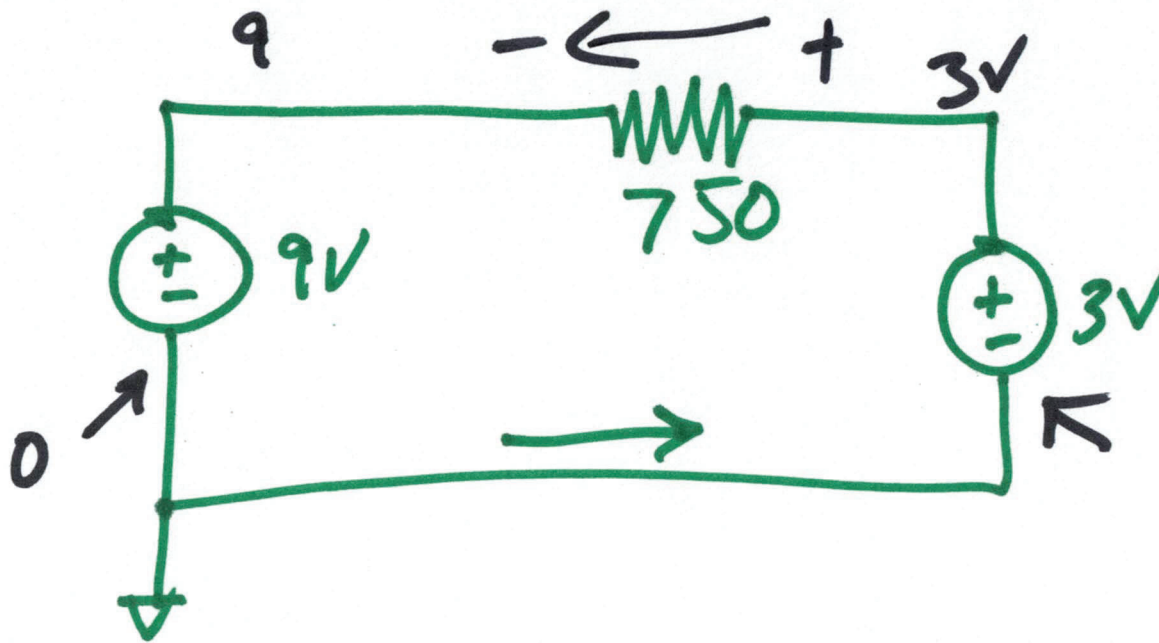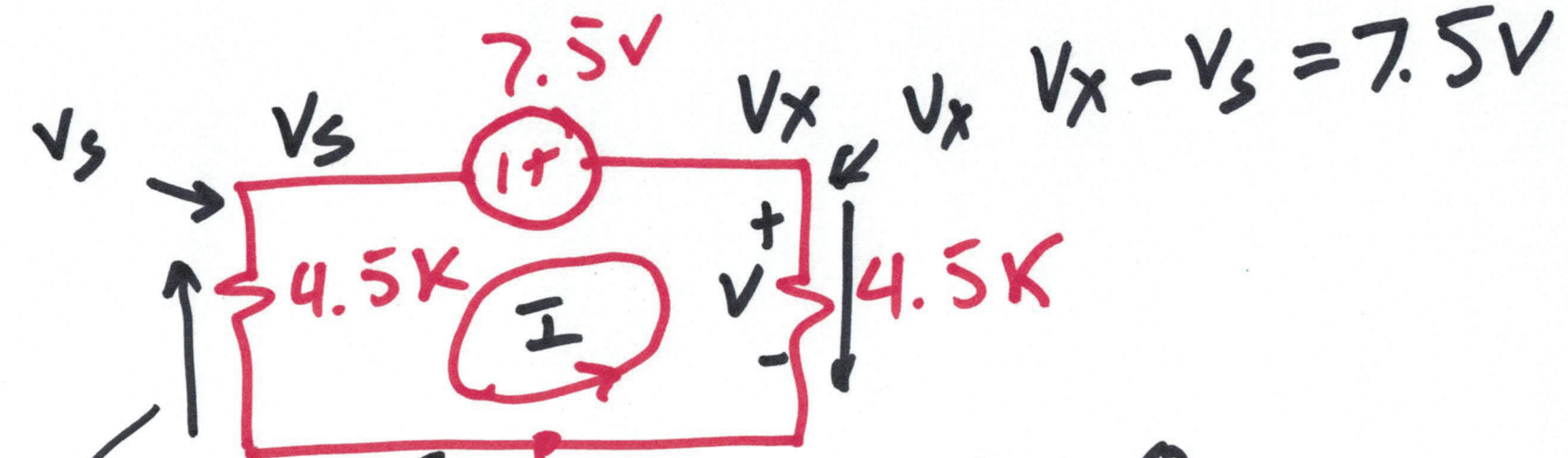
$$\frac{V_X - 0}{4.5K}$$

$$\frac{0 - V_S}{4.5K} \qquad = \qquad \frac{V_X - 0}{4.5K}$$

$$-V_S = V_X$$

$$V_X - V_S = 7.5V$$