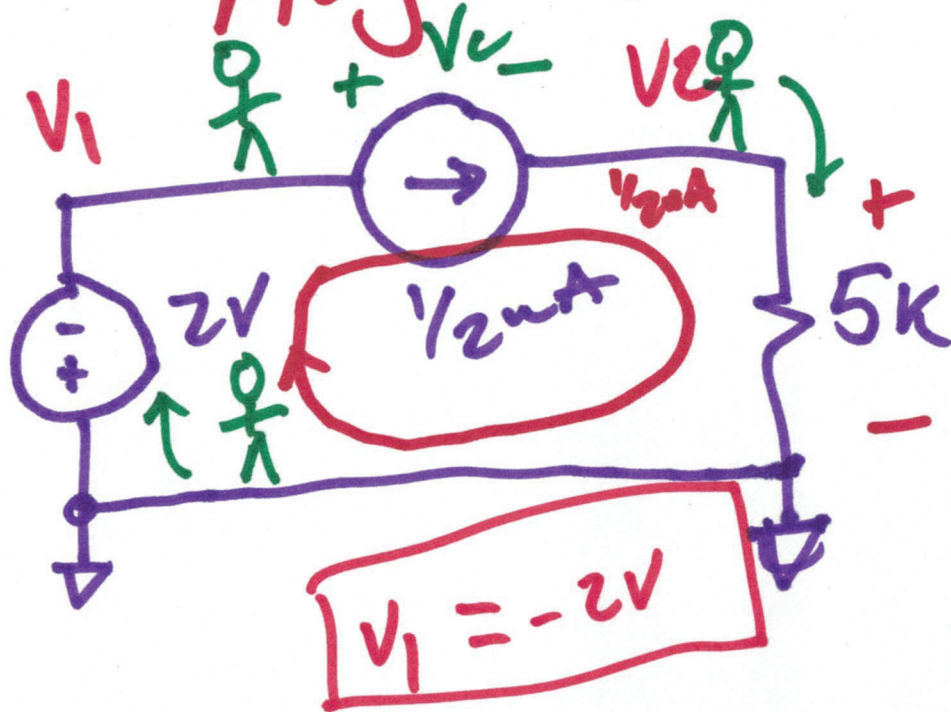


# EE 220 Circuits I

## Lecture 3

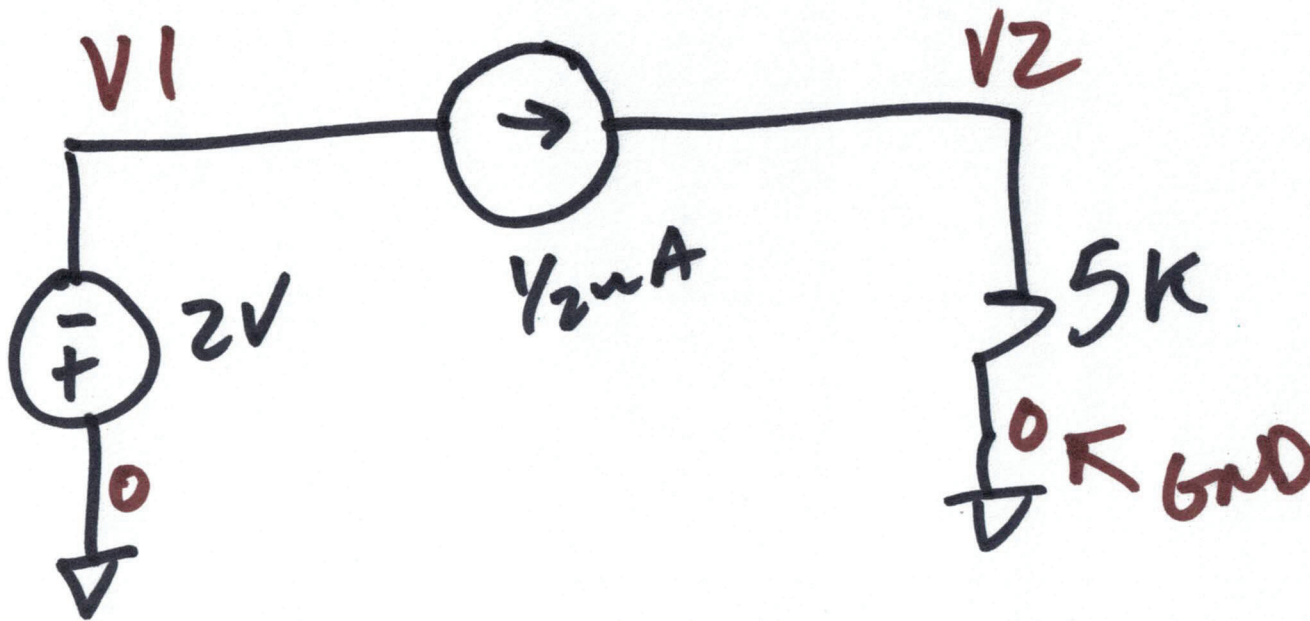
August 30, 2021



$$-5\text{k} \cdot \frac{1}{2}\mu\text{A} - 2 - V_c = 0$$

$$-2.5 - 2 - V_c = 0$$
$$V_c = -4.5\text{V}$$





Title

```
*
Vin 0 V1 2V
R1 V2 0 5K
IS V1 V2 500u
```

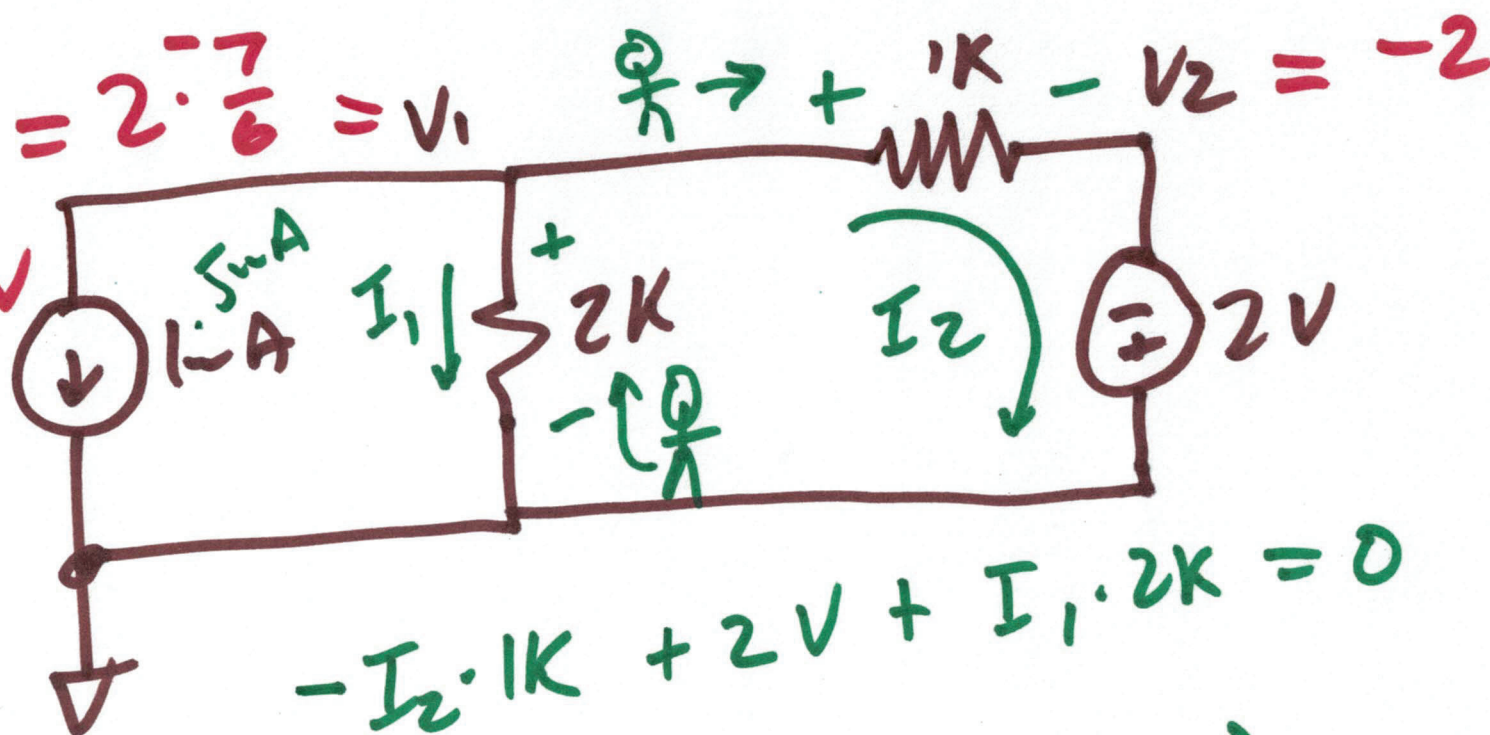
```
.op
.end
```

3)



$$\frac{-7}{3} = \frac{-14}{6} = 2 \cdot \frac{-7}{6} = v_1$$

$$-2.333V$$



$$-I_2 \cdot 1K + 2V + I_1 \cdot 2K = 0$$

$$I_1 + I_2 + 1.5\mu A = 0$$

$$I_1 = -(I_2 + 1.5\mu A)$$

$$-I_2 \cdot 1K + 2V + \frac{2K}{2K} (-I_2 - 1.5\mu A) = 0$$

$$-I_2 \cdot 1K + 2 - 2KI_2 - 3V = 0$$

4)

$$-3kI_2 - 1 = 0$$

$$I_2 = -\frac{1}{3} \text{ mA}$$

$$I_1 + -\frac{1}{3} \text{ mA} + \frac{3}{2} \text{ mA} = 0$$

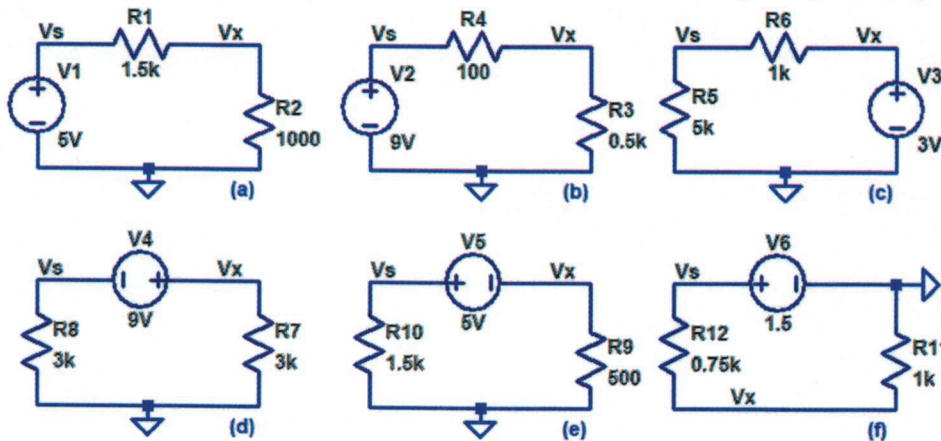
$$I_1 + -\frac{2}{6} \text{ mA} + \frac{9}{6} \text{ mA} = 0$$

$$I_1 = -\frac{7}{6} \text{ mA}$$

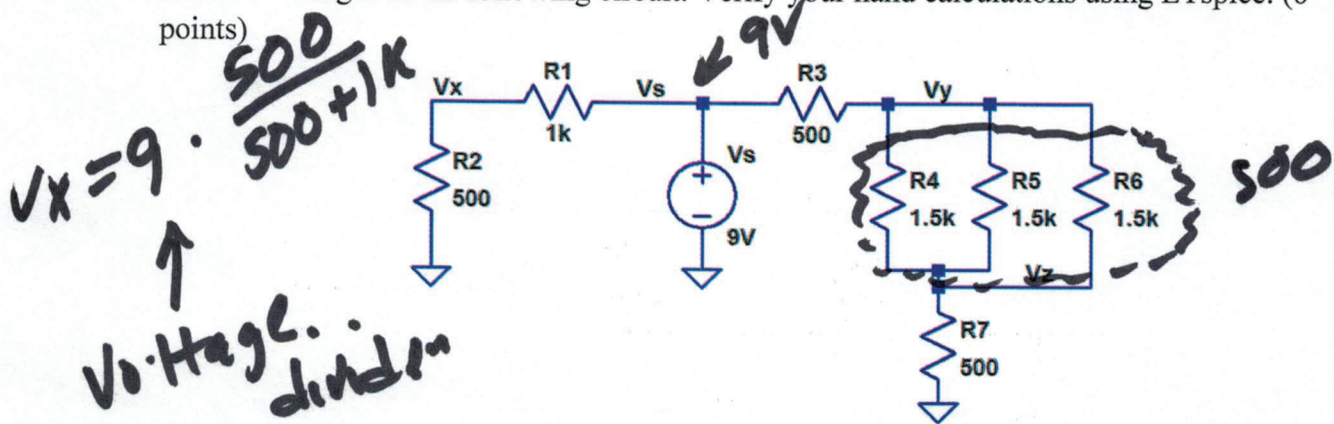
$$I_1 = -1\frac{1}{6} \text{ mA}$$

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

- Find the voltages  $V_x$  and  $V_s$  as well as the currents (assume a clockwise direction) flowing in each of the following circuits. Verify your hand calculations using LTspice. (9 points)



- Find the voltages in the following circuit. Verify your hand calculations using LTspice. (6 points)



- Show how to derive the voltage divider equation and the current divider equation for a two-resistor circuit. Ensure your derivation includes the two schematics you are using. Provide an example for each derivation. (4 points)
- Find the voltage across  $R_1$ , as indicated, in the following circuit. Verify your answer using LTspice. (2 points)

