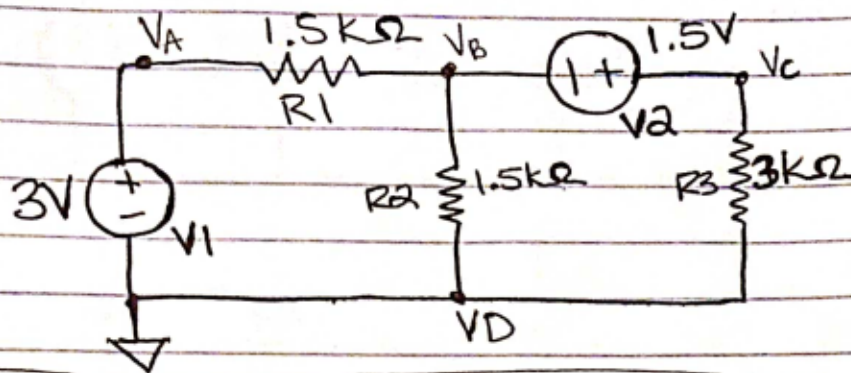


Lab 1 - Review Superposition and Thevenin's Equivalents

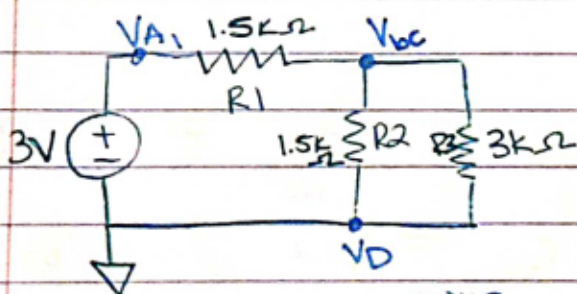
Task 1:



$$\begin{aligned}
 V_{R1} &= 1.8V + 0.3V = 2.1V & V_{R2} &= 1.2V - 0.3V = 0.9V & V_{R3} &= 1.2V + 1.2V = 2.4V \\
 I_{R1} &= 1.2mA + 0.2mA = 1.4mA & I_{R2} &= 0.8mA - 0.2mA = 0.6mA & I_{R3} &= 0.8mA & V_D &= 0V \\
 V_A &= 3V + 0V = 3V & V_B &= 0.9V & V_C &= 2.4V = 1.2V + 1.2V \\
 & & & (1.2 - 0.3V = 0.9V) & & & & \\
 I_{R3} &= (0.4 + 0.4)mA = 0.8mA
 \end{aligned}$$

Superimposed

V_1 only



$$V_{A1} = 3V - 0V = 3V \quad V_D = 0V$$

$$V_{Bc} = 3V \left(\frac{1k\Omega}{2.5k\Omega} \right) = 1.2V$$

$$V_{R1} = 3V - 1.2V = 1.8V \quad V_{R2} = \frac{V_{Bc} - 0V}{1.5k\Omega} = 1.2V$$

$$V_{Bc} - 0V = 1.2V \quad V_{R3} = 1.2V$$

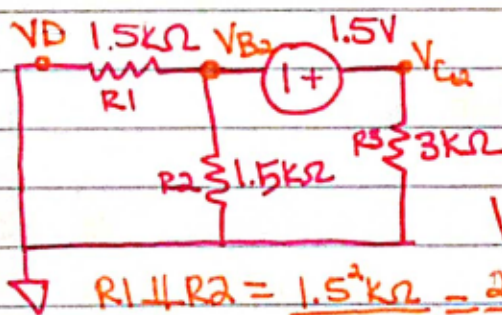
$$R_{2||R3} = \frac{1.5(3)k\Omega}{1.5+3k\Omega} = \frac{4.5k\Omega}{4.5k\Omega} = 1k\Omega \quad R_{eq} = 1.5k\Omega + 1k\Omega = 2.5k\Omega$$

$$I_{3V} = \frac{3V}{2.5k\Omega} = 1.2mA$$

$$I_{3V} = I_{R1} = 1.2mA \quad I_{R2} = \frac{1.2V}{1.5k\Omega} = 0.8mA$$

$$I_{R3} = \frac{1.2V}{3k\Omega} = 0.4mA$$

V_2 only



$$V_{B2} = 1.2V - 1.5V = -0.3V \quad V_D = 0V$$

$$V_{R3} = 0.4mA(3k\Omega) = 1.2V \quad V_{C2} = 1.2V$$

$$V_{R2} = 0 + (+0.3) = 0.3V \quad V_{R1} = 0.3V$$

$$R_{1||R2} = \frac{1.5^2k\Omega}{3k\Omega} = \frac{2.25k\Omega}{3k\Omega} = 0.75k\Omega \quad R_{eq} = 3k\Omega + 0.75k\Omega = 3.75k\Omega$$

$$I_{1.5V} = \frac{1.5V}{3.75k\Omega} = 0.4mA$$

$$I_{1.2V} = I_{R3} = 0.4mA$$

$$I_{R2} = \frac{0.3V}{1.5k\Omega} = 0.2mA \quad I_{R1} = \frac{0.3V}{1.5k\Omega} = 0.2mA$$