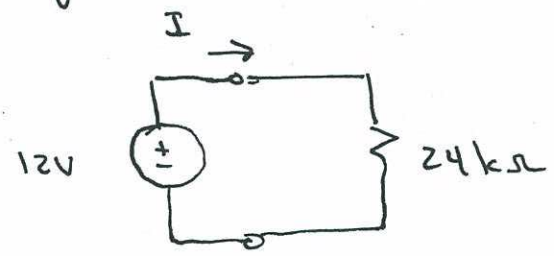
Exercises
Chapter 2.1

1. Resistors are in series, so the equivalent resistance is:

$$R_{eq} = 10k\Omega + 4k\Omega + 4k\Omega + 6k\Omega$$

$$= 24k\Omega$$

Equivalent circuit:



$$I = \frac{12V}{24k\Omega} = 0.5A$$

All elements have same current, so:

$$V_1 = (4k\Omega)(0.5A) = \underline{\underline{2V}}$$

ALTERNATE: Voltage divider

$$V_1 = 12V \left(\frac{4k\Omega}{10k\Omega + 4k\Omega + 4k\Omega + 6k\Omega}\right) = 12V \left(\frac{4k\Omega}{24k\Omega}\right)$$

$$\underline{\underline{V_1 = 2V}}$$

Exercises
chapter 2.2

1. Easiest approach is probably a current divider:

$$I = 5\,mA\left(\frac{3\,k\Omega}{3k\Omega + 5k\Omega}\right) = 5\,mA\left(\frac{3}{8}\right)$$

$$\underline{\underline{I = \frac{15}{8}\,mA}}$$

2. Probably easiest to use current divider formula:

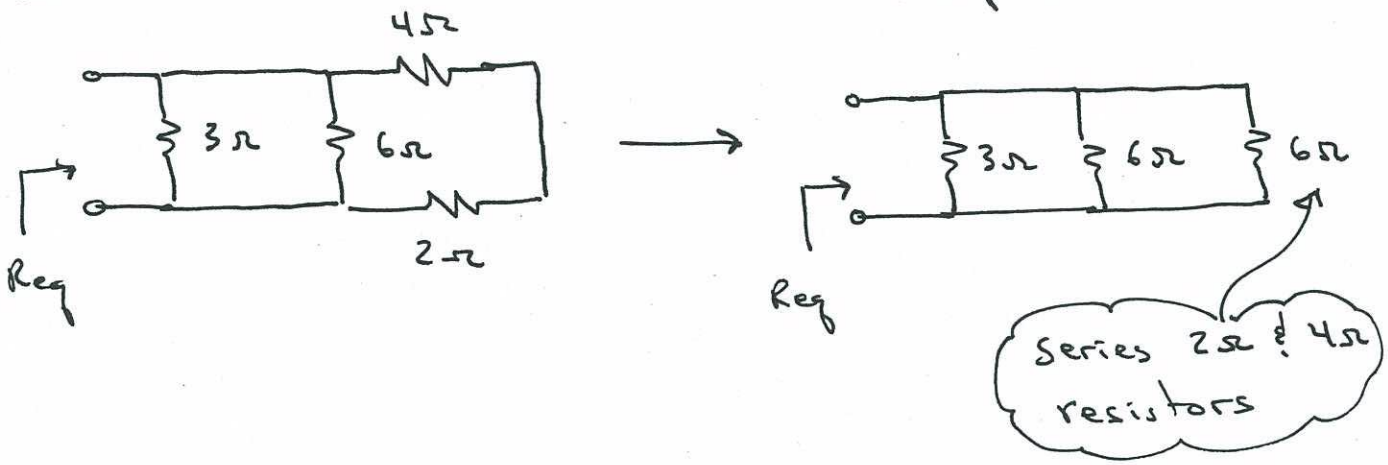
$$I = 3\,mA\left(\frac{R}{R + 1k\Omega}\right) = 2\,mA$$

$$\frac{R}{R+1k\Omega} = \frac{2}{3} \quad \Rightarrow \quad \underline{\underline{R = 2k\Omega}}$$

Exercises

Chapter 2.3

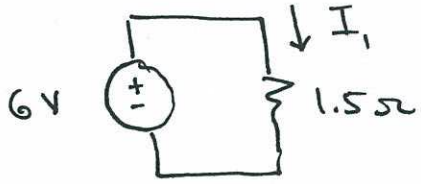
1(a)



Combine parallel 3Ω, 6Ω, 6Ω resistors:

$$R_{eq} = \frac{1}{\frac{1}{3\Omega} + \frac{1}{6\Omega} + \frac{1}{6\Omega}} = \underline{\underline{1.5\Omega}}$$

(b) From the above, an equivalent circuit is:



$$I_1 = \frac{6V}{1.5\Omega} = \underline{\underline{4A}}$$

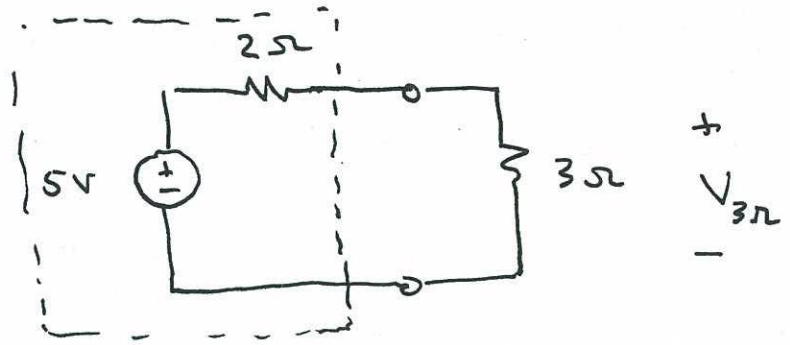
Could use current divider & I_1 above to get I_2, but probably easier to use Ohm's law:

$$I_2 = \frac{6V}{3\Omega} \Rightarrow \underline{\underline{I_2 = 2A}}$$

Exercises

Chapter 2.4

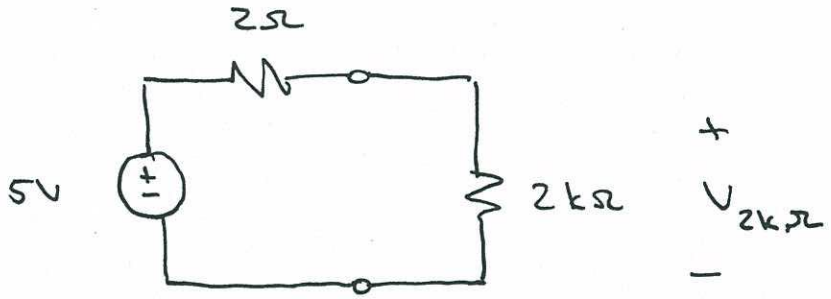
1.



Voltage divider:

$$V_{3\Omega} = 5V \left(\frac{3\Omega}{2\Omega + 3\Omega} \right) = \underline{\underline{3V}}$$

2.



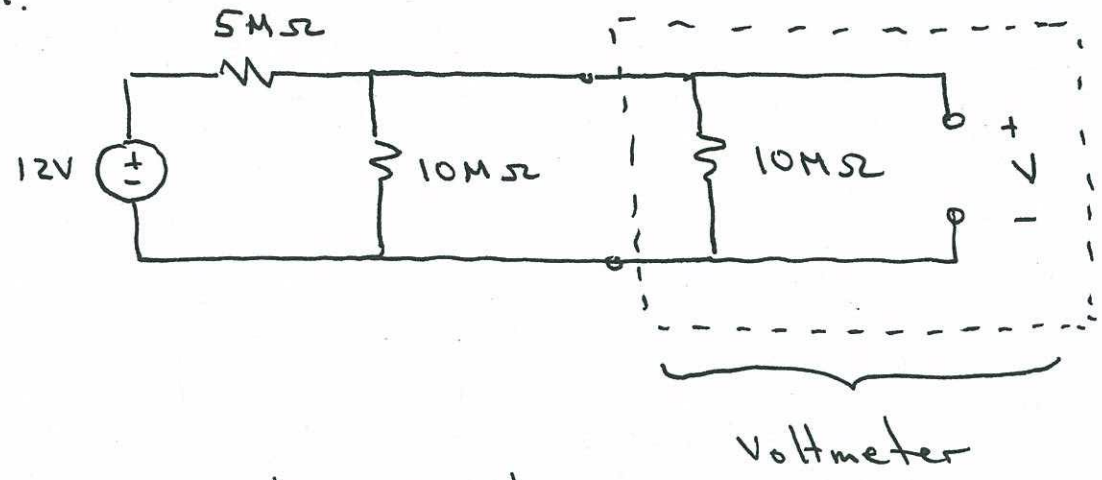
Voltage divider:

$$V_{2k\Omega} = 5V \left(\frac{2000\Omega}{2000\Omega + 2\Omega} \right) = \underline{\underline{4.995V}}$$

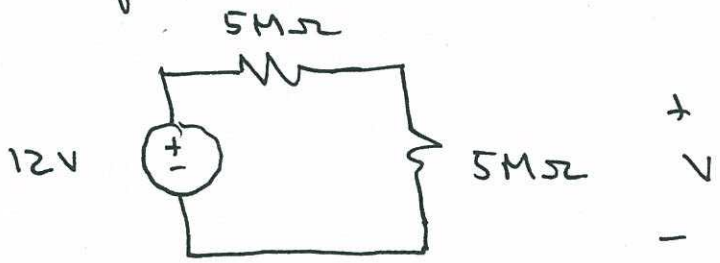
Exercises

chapter 2.5

1.



Equivalent circuit



$$V = \left(\frac{5\,M\Omega}{5\,M\Omega + 5\,M\Omega} \right) 12V \Rightarrow \underline{\underline{V = 6V}}$$