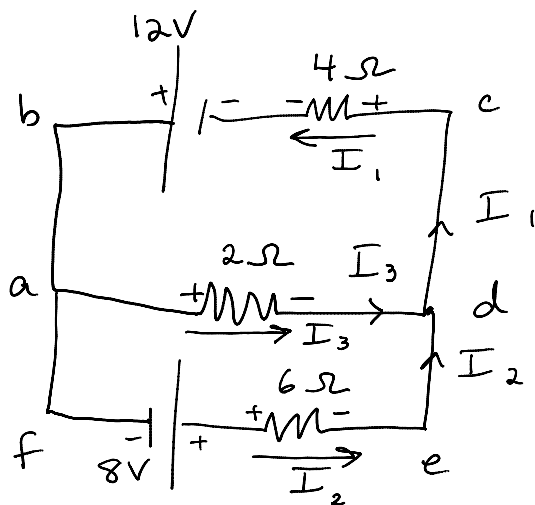


Find all currents in the circuit shown.



Junction

Currents in = out

$$I_3 + I_2 = I_1 \quad \#1$$

Loop Rule

abcda

$$-12 + 4I_1 + 2I_3 = 0$$

#2

fadef

$$-2I_3 + 6I_2 - 8 = 0$$

#3

Sub #1 into #2

$$-12 + 4(I_3 + I_2) + 2I_3 = 0$$

$$4I_2 + 6I_3 = 12 \quad \#4$$

$$6I_2 - 2I_3 = 8 \quad \#3$$

$$\text{Master} = \begin{vmatrix} 4 & 6 \\ 6 & -2 \end{vmatrix} = -8 - 36 = -44$$

$$I_2 = \frac{\begin{vmatrix} 12 & 6 \\ 8 & -2 \end{vmatrix}}{-44} = \frac{-24 - 48}{-44} = 1.6 \text{ A}$$

$$I_3 = \frac{\begin{vmatrix} 4 & 12 \\ 6 & 8 \end{vmatrix}}{-44} = \frac{32 - 72}{-44} = 0.9 \text{ A}$$

$$I_1 = I_2 + I_3 = 2.5 \text{ A}$$