Solve the system of equations

$$\begin{aligned} a + \quad b + \quad c &= \quad 40 \\ 3.9a + 3.6b + 3.0c &= 141.3 \end{aligned}$$

using the Elimination Method.

Solution Start by multiplying the first equation by -3.9 and add it to the second.

$$\begin{array}{r} -3.9a - 3.9b - 3.9c = -156 \\ 3.9a + 3.6b + 3.0c = 141.3 \\ \hline -0.3b - 0.9c = -14.7 \end{array}$$

Place the sum in place of the second equation to yield

$$\begin{aligned} a + \quad b + \quad c &= \quad 40 \\ -0.3b - 0.9c &= -14.7 \end{aligned}$$

Next we place a 1 in front of b in the second equation. This is done by multiplying the second equation by $-\frac{1}{0.3}$:

$$\begin{array}{r} -0.3b - 0.9c = -14.7 \\ \times -\frac{1}{0.3} \\ \hline b + \quad 3c = 49 \end{array}$$

Place the result in place of the second equation to give the equivalent system,

$$\begin{aligned} a + \quad b + \quad c &= 40 \\ b + \quad 3c &= 49 \end{aligned}$$

Multiply the second equation by -1 and add it to the first equation:

$$\begin{array}{r} -b - 3c = -49 \\ a + b + \quad c = \quad 40 \\ \hline a \qquad - 2c = -9 \end{array}$$

Replace the first equation with this sum to yield

$$\begin{aligned} a + \quad - \quad 2c &= -9 \\ b + \quad 3c &= 49 \end{aligned}$$

Solve the first equation for a and the second equation for b. This gives

$$\begin{aligned} a &= -9 + 2c \\ b &= 49 - 3c \end{aligned}$$

The original system has an infinite number solutions. Each solution corresponds to a different value for c. Each solution has the form

$$(-9 + 2c, 49 - 3c, c)$$

This is like an ordered pair, but is called an ordered triple since the solution consists of three parts instead of two.