When one of the three equations has less than three variables, we might want to start by using the substitution method:

$$\begin{cases} 2x + 3y + z = 16 \\ y - z = 2 \\ 3x - 2y - 3z = -22 \end{cases}$$

Step 1- Look at the equation with less than three variables and choose a variable for which to solve. TIP- If possible, choose a variable with a coefficient of 1 or –1 .

Our best choices look to be *y* in the green equation or *z* in the green equation. Let's pick *y* in the green equation.

Step 2- Solve for that variable in one equation (get it by itself on one side).

$$y - z = 2$$
$$\boldsymbol{y = z + 2}$$

Step 3- Substitute for that variable in the other two equations. This will give us two new equations.

$$2x + 3y + z = 16$$
$$2x + 3(\boldsymbol{z + 2}) + z = 16$$
$$2x + 3z + 6 + z = 16$$
$$\boldsymbol{2x + 4z = 10}$$

Our first new equation

$$3x - 2y - 3z = -22$$
$$3x - 2(\boldsymbol{z + 2}) - 3z = -22$$
$$3x - 2z - 4 - 3z = -22$$
$$\boldsymbol{3x - 5z = -18}$$

Our second new equation

Step 4- Take these two new equations and solve for the two variables in them.

$$2x + 4z = 10 \quad (3)$$
$$3x - 5z = -18 \quad (-2)$$

$$6x + 12z = 30$$
$$-6x + 10z = 36$$
$$22z = 66$$
$$\boxed{\boldsymbol{z = 3}}$$

$$6x + 12(3) = 30$$
$$6x + 36 = 30$$
$$6x = -6$$
$$\boxed{\boldsymbol{x = -1}}$$

Step 5- Plug these values in any of the three original equations to solve for the third (and last) variable.

We will use the green equation (it doesn't matter which equation you select).

$$y - z = 2$$
$$y - (3) = 2$$
$$\boxed{\boldsymbol{y = 5}}$$

Step 6- Write the solution as an ordered triple [in the form (x, y, z)].

$$\boxed{(\mathbf{-1}, \mathbf{5}, \mathbf{3})}$$

Step 7 (Optional)- Check the solution by substituting the ordered triple into all three equations to make sure it works.