Linear Combo Calculations

For the problem posed here, how do we find x and y? Combine the vectors on the left and equate entries on right and left:

$$2x + 0y = 8 \quad \text{intersection of}$$
$$x + y = 11 \quad \text{lines problem}$$

$\implies$ we have two different but equivalent geometric interpretations of a 2D linear system.

Example:

$$
\begin{array}{rcl}
2u + v + w &=& 5 \\
4u - 6v + 0w &=& -2 \\
-2u + 7v + 2w &=& 9
\end{array}
\quad \text{becomes} \quad
\left[\begin{array}{c} 2u + v + w \\ 4u - 6v + 0w \\ -2u + 7v + 2w \end{array} \right] =
\left[\begin{array}{c} 5 \\ -2 \\ 9 \end{array} \right]
$$

$$
\text{which becomes} \quad u \left[\begin{array}{c} 2 \\ 4 \\ -2 \end{array} \right] + v \left[\begin{array}{c} 1 \\ -6 \\ 7 \end{array} \right] + w \left[\begin{array}{c} 1 \\ 0 \\ 2 \end{array} \right] = \left[\begin{array}{c} 5 \\ -2 \\ 9 \end{array} \right]
$$

intersection of planes problem $\iff$ linear combo problem