1. $U = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$, $V = \begin{bmatrix} -3 \\ 3 \end{bmatrix}$

$\underline{U+V} = \begin{bmatrix} -1-3 \\ 2+3 \end{bmatrix} = \begin{bmatrix} -4 \\ 5 \end{bmatrix}$ $\underline{U-2V} = \begin{bmatrix} -1-2(-3) \\ 2-2(+3) \end{bmatrix}$

$= \begin{bmatrix} 5 \\ -4 \end{bmatrix}$

5 $4x_1 + (-8)x_2 = 9$

$-3x_1 + 7x_2 = -6$

$2x_1 + 0 = -5$

11 If b is a linear combination of a_1, a_2, a_3 then

$[a_1 \ a_2 \ a_3 \mid b]$ must have a solution.

$\Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 5 & 2 \\ -2 & 1 & -6 & -1 \\ 0 & 2 & 8 & 6 \end{array}\right]$

$\downarrow r_2 + 2r_1 \rightarrow$ new r_2.

$\left[\begin{array}{ccc|c} 1 & 0 & 5 & 2 \\ 0 & 1 & 4 & 3 \\ 0 & 2 & 8 & 6 \end{array}\right] \xrightarrow{r_3 - 2r_2 \rightarrow \text{new } r_3} \boxed{\left[\begin{array}{ccc|c} 1 & 0 & 5 & 2 \\ 0 & 1 & 4 & 3 \\ 0 & 0 & 0 & 0 \end{array}\right]}$

$\therefore x_3$ is free. $\Rightarrow$ matrix is consistent.
$\{x_1 = 2, x_2 = 3, x_3 = 0$ would be a trivial solution$\}$.

Hence, YES b IS a linear combination of a_1, a_2, a_3 $\{$infact just $a_1, a_2\}$.