1.

$$\left[\begin{array}{ccc|c} 1 & 2 & -3 & 5 \\ 2 & 1 & -3 & 13 \\ -1 & 1 & 0 & -8 \end{array}\right]$$

$R_2 - 2R_1;\ R_3 + R_1$

$$\left[\begin{array}{ccc|c} 1 & 2 & -3 & 5 \\ 0 & -3 & 3 & 3 \\ 0 & 3 & -3 & -3 \end{array}\right]$$

$y = 8x - 8$

$2x + x - 8 - 3z = 13$

$3x - 3z = 21$

$x - z = 7$

$x = 7 + z$

$y = z - 1$

$7 + z + 2z - 2 - 3z = 5$

$0 = 0$

$5 + 0_2 = 5$

$14 + 2z + z - 1 - 3z = 13$

$13 + 0z = 13$

infinite solutions

3. $AB \begin{bmatrix} 4 & -3 \\ -3 & 5 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 4 \\ 3 & -2 \end{bmatrix}$ $\quad 4\times2 \quad 2\times3$

$3\times2 \quad \times 2 \times 2$

$$= \begin{bmatrix} 4-9 & 16+6 \\ -3+15 & -12-10 \\ 3 & -2 \end{bmatrix}$$

$$= \begin{bmatrix} -5 & 22 \\ 12 & -22 \\ 3 & -2 \end{bmatrix}$$