## More Linear Systems Exercises

Write each of the following linear systems as an augmented matrix. Reduce to echelon form by Gaussian elimination. Finally determine all possible solutions if there is one.

1.	$x_1 + 2x_2 - x_3 + 2x_4 = 3$ $x_1 + 3x_2 - x_3 + 3x_4 = 4$	2.	$x_1 + 2x_2 - x_3 + 2x_4 = 3$ $x_1 + 2x_2 - x_3 + 3x_4 = 4$
3.	$x_1 - 2x_2 - 3x_3 - 2x_4 = 0$ -x_1 + 4x_2 + 4x_3 + 2x_4 = 4 2x_1 - 2x_2 - 3x_3 - 8x_4 = 8	4.	$x_1 - 2x_2 - 3x_3 - 2x_4 = 0$ $2x_1 - 2x_2 - 5x_3 - 4x_4 = 4$ $x_1 + 2x_2 + x_3 - 6x_4 = 12$ $-x_1 + 4x_2 + 6x_3 - 2x_4 = 8$
5.	$x_{2} + 2x_{3} - 4x_{4} = 1$ $x_{1} + 3x_{2} - 2x_{3} + 2x_{4} = 6$ $-x_{2} + 2x_{3} + 7x_{4} = 6$ $x_{1} + 3x_{2} - x_{3} + 3x_{4} = 8$	6.	$x_1 - 2x_2 + 2x_3 + 5x_4 = 1$ $x_2 + x_3 + 2x_4 = 2$ $x_1 - 2x_2 + x_3 + 8x_4 = 5$ $2x_2 + x_3 + 7x_4 = 9$

My answers:  
1. 
$$x_1 = 1 + \alpha$$
,  $x_2 = 1 - \beta$ ,  $x_3 = \alpha$ ,  $x_4 = \beta$   
2.  $x_1 = 1 - 2\alpha + \beta$ ,  $x_2 = \alpha$ ,  $x_3 = \beta$ ,  $x_4 = 1$   
3.  $x_1 = 8 + 6\alpha$ ,  $x_2 = 1 - \alpha$ ,  $x_3 = 2\alpha + 2$ ,  $x_4 = \alpha$   
4. Same as 3.  
5.  $x_1 = -3$ ,  $x_2 = 3$ ,  $x_3 = 1$ ,  $x_4 = 1$ 

6. No solution.