

### Linear algebra 1R, Problem sheet 1

1. Compute and draw in coordinate system  $A$ ,  $B$ ,  $A + B$  i  $-2A + 3B$  where:  
(a)  $A = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ ,  $B = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ , (b)  $A = \begin{pmatrix} -3 \\ 1 \end{pmatrix}$ ,  $B = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$ .
2. Write down parametric equation of the line passing through point  $A$  in the direction of vector  $U$ . Draw:  
(a)  $A = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ ,  $U = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$ , (b)  $A = \begin{pmatrix} -3 \\ 1 \end{pmatrix}$ ,  $U = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ .
3. Write down equation of the line passing through point  $A = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$  and orthogonal to vector  $U = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$ .
4. Find four different vectors  $U$ , such that  $\langle U, \begin{pmatrix} 1 \\ 1 \end{pmatrix} \rangle = 0$ .
5. Find  $P_U(V)$  i  $P_V(U)$  where (a)  $U = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ ,  $V = \begin{pmatrix} -2 \\ 2 \end{pmatrix}$ , (b)  $U = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$ ,  $V = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ .