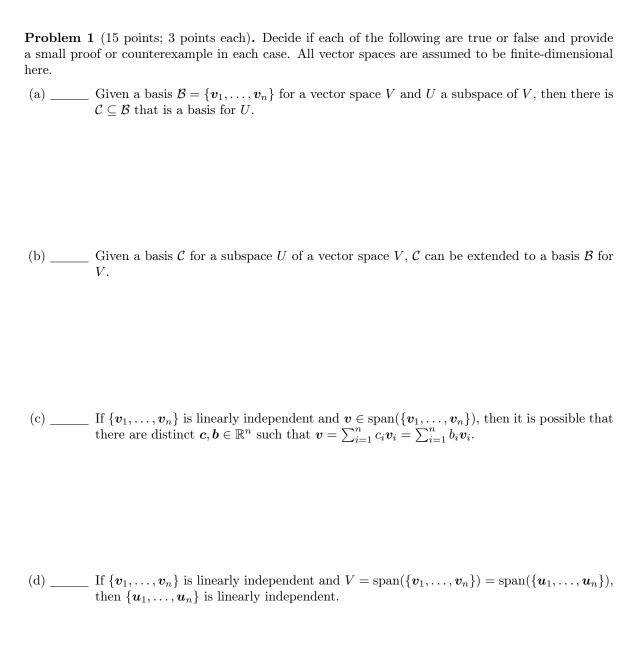
## Quiz 3



**Problem 2** (10 pts). Find a basis for span $\{u_1, \ldots, u_5\}$  from among the vectors  $u_1, \ldots, u_5$ , where

$$oldsymbol{u}_1 = egin{bmatrix} 1 \ 2 \ 2 \end{bmatrix} \qquad oldsymbol{u}_2 = egin{bmatrix} 2 \ 5 \ 4 \end{bmatrix} \qquad oldsymbol{u}_3 = egin{bmatrix} 1 \ 3 \ 2 \end{bmatrix} \qquad oldsymbol{u}_4 = egin{bmatrix} 2 \ 7 \ 4 \end{bmatrix} \qquad oldsymbol{u}_5 = egin{bmatrix} 1 \ 1 \ 0 \end{bmatrix}$$

Do this by building the matrix consisting of the  $u_i$ 's as rows or columns (you must choose correctly) and use Gaussian elimination. This is described carefully in the notes.

**Problem 3** (10 pts). Let  $c_1, c_2, \ldots, c_n$  be n distinct real numbers. Let  $p_i = \prod_{\substack{j=1 \ j \neq i}}^n (x - c_j)/(c_i - c_j)$ . Show that  $\mathcal{B} = \{p_1, p_2, \ldots, p_n\}$  is a basis for  $P_{n-1}$ .

Hint: Compute  $p_i(c_j)$  and look at what happens when i=j and when  $i\neq j$ . Use this to argue the independence of  $\mathcal{B}$ .