Group 1	Group 2	Group 3
$(5,5)$	$(5,0)$	$(9,3)$
$(-6,-5)$	$(7,4)$	$(-1,3)$
$(-4,-8)$	$(-4,-3)$	$(9,7)$

1. Lay your sheet of regular graph paper over your sheet of u-v graph paper, and estimate the values of scalars α and β such that $\alpha u + \beta v = w$ for each vector w assigned to your group in the chart above.

2. Now let $u = (3,1)$ and $v = (-1,-2)$. Find exact values for the scalars α and β such that $\alpha u + \beta v = w$, for each vector w.

3. Consider an arbitrary vector $w = (x,y)$. Derive formulas for α and β in terms of x and y.

4. Now let $u = (1,3)$, $v = (-2,-6)$. What goes wrong geometrically if you try to write w as a linear combination of u and v? What goes wrong algebraically?