Please put away all electronic devices. This sheet will be collected but not assessed. The professor will look at the second page but will ignore the first page.

**What did you learn** (totally made up by your professor). Through the experience of taking this course, did you learn anything about yourself? Maybe you learned something about your interests, your likes/dislikes, your strengths, how you collaborate/interact with others, something about how you operate as a student… or really anything. Just reflect on what you are taking away from this experience aside from the core material and skills that we have covered.

What is the main purpose of principal component analysis (PCA)?

Principal components are nothing more than a set of basis vectors. How do we find these vectors?

As with all things in linear algebra, simply enumerating the dimensions of various objects brings us some useful understanding. Suppose you have 30 data points in four-dimensional space, that is, with coordinates (x, y, z, w). How many principal components are there? What are the dimensions of each one? What is the size of the rotation matrix (that is, the matrix that does a change of basis between the original coordinates and new coordinates)?

Suppose that the eigenvalues associated with the three principal components of some data (different from the data above) are 0.8, 0.7, and 0.5. What percentage of variation in the data do the first two principal components capture?