

**MATH 515 HOMEWORK-3 DUE AT THE BEGINNING OF CLASS ON  
WEDNESDAY, OCTOBER 8.**

One goal for this course is for you to develop your skill in effectively communicating mathematics. With this in mind, you should clearly write up your solutions. Solutions with little or no justification will receive little or no credit.

- (1) Read chapter 3 in *Discovering Geometry*.
- (2) In class we discussed the "construction" of a 4-dimensional cube; we stated the properties a 4-dimensional cube should have, and we based our argument on our knowledge of lower-dimensional cubes. Figure out a mathematical description of a "square"-based pyramid embedded in a 4-dimensional space. You should probably start by articulating the structure of the usual square-based pyramid; and you should first carefully define the *lower*-dimensional analogs.
- (3) The volume of a 4-dimensional unit cube is 1, and we know how to find the volume of a 4-dimensional parallelepiped. What formula would give you the volume of your "square"-based pyramid in 4-space? Make an argument. A good argument will be compatible with your work in the preceding problem.
- (4) Do problems 3, 6 – 8, 13 – 16, 18 – 19 from chapter 3 in *Discovering Geometry*.