

**MATH 515 HOMEWORK-7 DUE AT THE BEGINNING OF CLASS ON MONDAY,
NOVEMBER 24.**

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.

- (1) Read chapter 6, if you haven't already, through the two-dimensional discussion.
- (2) Do problems 4 and 6 from chapter 6. Make sure you prove/justify your solutions.
- (3) In class we showed that successive reflections about two intersecting lines is equivalent to a rotation through twice the (counterclockwise) angle from the first line to the second. Can you prove a converse to this? That is, can you express any counterclockwise rotation of the plane about a point C , through an angle θ , as the composition of two reflections? If so, are the lines of reflection unique?
- (4) Do experiment 1 from page 234, and write your observations and conjectures.
- (5) Do problem 11, and try to be explicit in addressing the last question here.
- (6) (a) On page 243, first read the algebraic proof at the top of the page and note that it formalizes, algebraically, one case of the proof a student gave in class that: the displacement of a point after successive reflections through 2 parallel lines is twice the distance between the lines of reflection.

(b) The "problem for right now" considers four other cases. Do these, and write a complete proof for any *one* case.
- (7) Do problems 18, 20, and 22 - 24.