A. Due at the start of class on Day 5 (but not collected): Complete these exercises about basic skills. If you feel that you need more practice, then do more problems from the book.

Section 11.3 Exercises 3, 4, 7c, 15
Section 12.7 Exercises 4-5, 16, 36-37, 53

B. Due as part of your homework packet on Day 6: Submit polished solutions, including all necessary work and no unnecessary work, in the order assigned.

1. Section 11.3 Exercises 51, 56 together

2. Section 12.7 Exercises 79-80 together

3. Recall from class that geologists use two angles, called *strike* and *dip*, to describe the attitude of a plane P passing through the origin in three-dimensional space. The dip δ is the acute angle that P makes with the x-y-plane. Let L be the line where P intersects the x-y-plane. There are two unit vectors $\vec{v}$ that point along L from the origin. Pick the vector $\vec{v}$ such that an ant, walking along L in the direction of $\vec{v}$, sees the plane above her ($z > 0$) on her left side and below her ($z < 0$) on her right side. The strike σ is the angle in the horizontal plane, measured clockwise from the positive y-axis, that ends at $\vec{v}$. A *pole* is a unit vector $\vec{p}$ perpendicular to P. Each P has two valid poles, which are opposite each other, with one pointing up and the other pointing down.

(Some special cases are overlooked in the foregoing description. If P is horizontal, then dip is $0°$, strike is undefined, and the poles are vertical. If P is vertical, then the dip is $90°$, there are two valid values for strike, and both poles are horizontal.)

Derive expressions for the spherical coordinates ϕ, θ of a pole $\vec{p}$ (upward- or downward-pointing), in terms of strike σ and dip δ.