Work through the following problems in groups of about four. Take turns writing; everyone should get a chance to write for some of the problems. It's more important to understand the problems than to do all of them.

1. Find all solutions to the following equations

   (a) $\sin\theta + \dfrac{1}{\sqrt{2}} = 0$

   through by cosine)

   (c) $\tan 2\theta = -1$

   (b) $\cos\theta + 2\sec\theta = -3$ (hint: multiply

   (d) $\sin\frac{\theta}{2} = \frac{1}{2}$

2. Let $z = 2 + 3i$ and $w = 2 + i$. Compute and simplify the following.

   (a) $z\bar{z}$ (b) w/z (c) $z - w$

3. Use polynomial long division to find the quotients and the remainders.

   (a) $\dfrac{x^3 - 4x^2 + x - 2}{x - 5}$

   (c) $\dfrac{4y^4 - y^3 + 2y - 1}{2y^2 - 3y - 4}$

   (b) $\dfrac{z^5 - 1}{z - 1}$

4. Which of the following are guaranteed to have a (potentially complex) solution by the fundamental theorem of algebra?

   (a) $\sqrt{3}x^{17} + \sqrt{2}x^{13} + \sqrt{5} = 0$

   (b) $17x^{\sqrt{3}} + 13x^{\sqrt{2}} + 1 = 0$

   (c) $\dfrac{1}{x^2 + 1} = 0$