Section 2.1 Math 141
Systems of Linear Equations with Unique Solutions

<u>Main ideas</u>

Systems of linear equations come from restrictions/conditions on unknown values.

Gauss-Jordan Elimination is typically the best strategy/tool for finding solutions. Technology can help us do so.

<u>In Class</u>

1. Let's spend some time on the Nickels and Dimes problems.

2. There are a few different ways to find the solution to a consistent system of equations. "Consistent" means "it has a solution." Let's look at:
$$n + \quad d = 6$$
$$5n + 10d = 75$$

3. Let's look at the examples posted at the class homepage. On the front page (the 2 x 2 problem), at each step we needed to decide what to do next. On the backside, we followed a specific strategy, "Gauss-Jordan Elimination with Pivoting." In both cases, we want to start thinking in terms of matrices rather than equations.

4. In class you will work in groups on HW 2.1.74:
   A dietitian wishes to plan a meal around three foods.
   - Each ounce of food I contains 10% of the daily requirements for carbohydrates, 10% for protein, and 15% for vitamin C.
   - Each ounce of food II contains 10% of the daily requirements for carbohydrates, 5% for protein, and 0% for vitamin C.
   - Each ounce of food III contains 10% of the daily requirements for carbohydrates, 25% for protein, and 10% for vitamin C.

   How many ounces of each food should be served in order to supply exactly the daily requirement for each nutrient?

5. See the online tools for doing Gauss-Jordan Elimination. But learn how to do it by hand.

Next time: what if
   The number of equations ≠ the number of unknowns?
   There is no solution?
   There is more than one solution?

Bring some paper (for example, hole-punched, lined paper) to do work in class.