Homework for Week 3  
Oct. 8-12, 2007

The textbook exercises listed here should be completed before class begins; students will share solutions to these exercises at the beginning of class. You should be prepared to share a solution to any one of these.

Before Class on **Monday, October 8**, finish reading Section 3.1 and work the following exercises:
Section 3.1, # 9, 13, 27  
*Comments:* Problem 27 could be answered without matrices, but the point of this exercise is to use them anyway. Write matrices that represent the data in the given tables, and determine which mathematical operation on these matrices gives the answer that is asked for.

Before Class on **Tuesday, October 9**, read Section 3.2 and work the following exercises:
Section 3.2, # 9, 13, 15

Before Class on **Wednesday, October 10**, read Section 3.2 and work the following exercises:
Section 3.2, # 17, 21, 23

Before Class on **Thursday, October 11**, read Section 3.3 and work the following exercises:
Section 3.3, # 11, 13, 23  
*Comments:* You should read quickly through the section where the textbook describes how to find the inverse of a matrix algebraically; however you should use your calculator to find the inverse when you solve the homework problems.

Before Class on **Friday, October 12**, read Section 3.3 and work the following exercises:
Section 3.3, # 31, 33, 35

**Additional Practice Problems**

Practice as many of these problems as you can. You may use your solutions as notes during the quiz on Tuesday, October 16.

Section 3.1, # 3, 5, 7, 11, 15, 17, 19, 25  
Section 3.2, # 11, 19, 25, 27, 29  
Section 3.3, # 15, 17, 19, 21, 25
Your carefully written solutions to the following questions will be due at the beginning of class on Friday, October 12.

You’ve discovered what you think is the perfect recipe for nacho dip: cheddar cheese, hot salsa, and peanut butter. So you’ve decided to start a small business selling this stuff, and you need to determine how many supplies to purchase for the first batch. Let $x$ represent the number of cups of cheddar cheese, $y$ the number of cups of hot salsa and $z$ the number of cups of peanut butter. Note that if you add these all together, you get the total number of cups of nacho dip.

(a) You would like to start out by making 3000 cups of the nacho dip. Write an equation that says the total number of cups of nacho dip will be 3000.

(b) With some experimentation, you decide there should be twice as much hot salsa as peanut butter. You also decide there should be three times as much cheese as peanut butter. Write these facts as equation involving the variables $x$, $y$ and $z$.

(c) Solve this system of 3 equations to find out how much of each ingredient you should buy.

(d) If cheese costs $1.00 per cup, hot salsa costs $1.75 per cup, and peanut butter costs $1.50 per cup, find out how much it will cost to make the 3000 cups of nacho dip.

(e) After doing the calculation above, you realize that you can’t afford to make 3000 cups of nacho dip initially, because you only have $3000 of start-up money. If you want to spend all $3000 on supplies, set up and solve a system of equations to find out how many cups of each ingredient to purchase.

Let
\[ A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 2 & -1 \\ 1 & -3 \end{bmatrix} \quad \text{and} \quad C = \begin{bmatrix} 4 & 1 & -2 \\ 1 & 2 & 0 \end{bmatrix}. \]

Calculate each of the following expressions if it is defined; if it is undefined, say so. Do this by hand, not using a calculator. Show all your work.

(a) $A + B$

(b) $A + C$

(c) $3A - B$

(d) $AC$

(e) $CB$

Let
\[ A = \begin{bmatrix} 1 & x \\ 0 & 1 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & x^2 \\ 0 & 1 \end{bmatrix}. \]

What value(s) of $x$ will make the matrix equation $A^2 = B$ true? *(Hint: Answering this question requires you to calculate $A^2 = A \times A$ by hand.)*