

## 18.06 Problem Set 4

Due Wednesday, 12 March 2008 at 4 pm in 2-106.

**Problem 1:** Do problem 2 from section 3.5 (pg. 168) in the book.

**Problem 2:** Do problem 17 from section 3.5 (pg. 169).

**Problem 3:** Do problem 11 from section 3.6 (pg. 181).

**Problem 4:** Define the following matrices:

$$A = \begin{bmatrix} -1 & 1 \\ 2 & 4 \\ 3 & 0 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 3 & 1 & 0 \\ 2 & -1 & -1 & 7 \\ 1 & 0 & -2/7 & 2 \end{bmatrix}$$

First write down the dimensions of the four fundamental subspaces of  $A$  and  $B$  by calculating their ranks. Then find bases for the subspaces.

**Problem 5:** Do problem 3 parts a),c) from section 4.1 (pg. 191).

**Problem 6:** Do problem 21 from section 4.1 (pg. 193).

**Problem 7:** a) Project the vector  $(2, 7, 3)$  onto the line going through the origin and  $(1, 1, 1)$ .

b) Project the vector  $(2, 4, 5)$  onto the column space of the matrix

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \\ 0 & 1 \end{bmatrix}$$

**Problem 8:** a) Do problem 13 in section 4.2 (pg. 204).

b) Do problem 27 in section 4.2 (pg. 205).

**Problem 9:** Do problem 8 in section 8.2 (pg. 421). (The graph is the square one at the bottom of page 420.)

**Problem 10:** Do problem 11 in section 8.2 (pg. 421). Use the  $A$  you just calculated for problem 8 in section 8.2.