

**APPM 3310 — Problem Set 11**

Due: DO NOT HAND IN.

Note that problems like these may be on the exam!

Reminder: Exam 2 is on Wed, Nov 11. It will cover the material in Chapters 3, 4, and 5. You will be allowed to bring in one  $8\frac{1}{2}'' \times 11''$ , handwritten sheet of notes to the exam.

1. Section 5.5, p 264: #11b, 13
2. Section 5.6, p 271: #1c, 3c, 5c, 7, 11
3. Section 5.6, p 276: #17d (plus, answer the question posed in #21 using the matrix from 17d), 22c, 26
4. True or False. Let  $V$ ,  $W$ , and  $Z$  be finite dimensional vector subspaces of a finite dimensional space  $U$ . As usual, if the statement is true, explain why it is true. If it is false, give a counterexample.
  - (a) If  $V$  is orthogonal to  $W$ , then  $V^\perp$  is orthogonal to  $W^\perp$ ?
  - (b) If  $V$  is orthogonal to  $W$  and  $W$  is orthogonal to  $Z$ , then  $V$  is orthogonal to  $Z$ .
  - (c) The  $i^{\text{th}}$  row of an invertible matrix  $B$  is orthogonal to the  $j^{\text{th}}$  column of  $B^{-1}$ , if  $i \neq j$ .