Math 236　　　　　　**Problem Set 12**　　　　　　**Spring, 2001**

To be done but *not* turned in!

What the text denotes $\mathbb{R}^{m \times n}$ is what we denoted $\mathcal{M}_{m,n}$.

1.　(a) Do page 157, Exercise 1.

　　(b) Do page 157, Exercise 2.

2. Do page 157, Exercise 4 except consider the given set as a subset of $\mathcal{P}_3$ rather than of $\mathcal{P}_2$.

3.　(a) Do page 157, Exercise 6.

　　(b) Do page 157, Exercise 7.

4.　(a) Find a basis for the space of all *symmetric* 2×2 matrices, and determine its dimension.

　　(b) Do page 158, Exercise 24.

　　(c) Do page 158, Exercise 25.

5.　(a) Do page 164, Exercise 3. The transformation T is usually denoted tr, and $\mathrm{tr}(A)$ is called the *trace* of the matrix A.

　　(b) Do page 164, Exercise 9.

　　(c) Do page 164, Exercise 13.

6.　(a) Do page 173, Exercise 1.

　　(b) Do page 173, Exercise 3.

7.　(a) Do page 174, Exercise 22. The basis of $\mathcal{P}_2$ here is the usual one.

　　(b) Do page 174, Exercise 38.

8.　(a) Show that the functions $\cos(t)$, $\sin(t)$, $t\cos(t)$, $t\sin(t)$ are linearly independent. [Hence (b) below makes sense!]

　　(b) Do page 175, Exercise 61 (a).

9. Do page 238, Exercise 16.

10. Do page 239, Exercise 24.