DEPARTMENT OF MATHEMATICS & STATISTICS
MATH 1503

Paper Assignment 5

Instructions: Complete each of the following tasks.

A. Read the text, sections 1.5, 2.1 and 2.3. We skip 2.2.

B. Try some of the following problems from the text for practice (not to be handed in). It will be a few days or more before we cover all these topics.

Page 80 – True/False questions

Page 81 – 1(a), 4

Page 84 – 1, 2, 5, 6, 7, 10, 17, 29, 50, 63

Page 112 – True/False questions

Page 113 – 1(a), 2(a), 3(a), 4, 9, 10, 11, 13, 15, 16, 19, 23(a), 24(a), 27, 33

Page 135 – True/False questions

Page 136 – 1(a), 2, 3(a), 6, 12, 13, 15, 23, 27(a, e)

C. **Hand in** the following problems, as instructed in class (aim for Monday, October 20).

1. Condsider these three vectors in $\mathbb{R}^3$:

$$\mathbf{a} = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix}, \ \mathbf{b} = \begin{bmatrix} 3 \\ 0 \\ -2 \end{bmatrix}, \mathbf{c} = \begin{bmatrix} 4 \\ 1 \\ -7 \end{bmatrix}$$

   (a) The equation $x\mathbf{a} + y\mathbf{b} + z\mathbf{c} = \mathbf{0}$ clearly holds for scalars $x = y = z = 0$. But is there a non-trivial solution, in which not all of x, y, z equal 0? Show your work.

   (b) Using the previous part, determine whether $\mathbf{a}, \mathbf{b}, \mathbf{c}$ are linearly independent.

2. Give the 3×3 matrix A whose ijth entry is $i + j$.

   For that same matrix A, compute $A - A^T$.

3. Give the 2×3 matrix B whose ijth entry is $(-1)^j i$.