SUMMARY OF SECTION 1.5

A MATRIX OBTAINED FROM I_N BY A SINGLE ELEMENTARY ROW OPERATION IS CALLED AN <u>ELEMENTARY MATRIX</u>

IF E IS THE MATRIX RESULTING FROM A CERTAIN ELEMENTARY ROW OPERATION ON I_m, AND A IS $m \times n$, THEN EA IS THE MATRIX THAT RESULTS WHEN THIS SAME ROW OPERATION IS DONE TO A.

<u>THEOREM</u> — EVERY ELEMENTARY MATRIX IS INVERTIBLE, AND INVERSE IS ALSO AN ELEMENTARY MATRIX.

<u>THEOREM</u> — THE FOLLOWING STATEMENTS ARE ALL TRUE OR ALL FALSE:

a) A IS INVERTIBLE b) $Ax = 0$ HAS ONLY THE TRIVIAL SOLUTION

c) REDUCED ROW-ECHELON FORM OF A IS I d) A IS PRODUCT OF ELEMENTARY MATRICES.

IF MATRIX B CAN BE OBTAINED FROM MATRIX A BY PERFORMING A FINITE SEQUENCE OF ELEMENTARY ROW OPERATIONS TO A, A AND B ARE SAID TO BE <u>ROW EQUIVALENT</u>

NOTE: A IS INVERTIBLE $\Leftrightarrow$ IT IS ROW EQUIVALENT TO I

<u>TO FIND A^{-1}</u> WE PERFORM A SEQUENCE OF ELEMENTARY ROW OPERATIONS THAT REDUCES A TO I, AND THEN PERFORM THIS SAME SEQUENCE OF OPERATIONS ON TO OBTAIN A^{-1}.