SUMMARY OF SECTION 1.1

AN EQUATION IN N VARIABLES $X_1, X_2, \ldots, X_N$ WHICH CAN BE EXPRESSED $A_1 X_1 + A_2 X_2 + \cdots + A_N X_N = B$ FOR CONSTANTS $A_1, A_2, \ldots, A_N, B$ IS CALLED A <u>LINEAR EQUATION</u>.

A <u>SOLUTION</u> TO SUCH AN EQUATION IS A SEQUENCE OF NUMBERS $S_1, S_2, \ldots, S_N$ SO THAT WHEN WE SUBSTITUTE $X_1 = S_1, X_2 = S_2, \ldots, X_N = S_N$ THE EQUATION IS SATISFIED.

THE SET OF ALL SOLUTIONS OF THE EQUATION IS CALLED ITS <u>SOLUTION SET</u> OR <u>GENERAL SOLUTION</u>.

A FINITE SET OF LINEAR EQUATIONS IS CALLED A <u>SYSTEM OF LINEAR EQUATIONS</u> OR A <u>LINEAR SYSTEM</u>.

A <u>SOLUTION OF THE SYSTEM</u> IS A SEQUENCE OF NUMBERS $S_1, S_2, \ldots, S_N$ SO THAT WHEN WE SUBSTITUTE $X_1 = S_1, X_2 = S_2, \ldots, X_N = S_N$ EACH EQUATION IS SATISFIED.

THEOREM — EVERY SYSTEM OF LINEAR EQUATIONS HAS EITHER NO SOLUTIONS, EXACTLY ONE SOLUTION, OR INFINITELY MANY SOLUTIONS.