1.1 - Systems of Linear Equations

$$a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = b_1$$
$$a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2$$
$$a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = b_3$$

a_{ij}
i - row
j - column

Example

$$\begin{cases} x_1 - 3x_2 + x_3 = 8 \\ x_2 + 3x_3 = 5 \\ x_3 = 2 \end{cases}$$

Row-Echelon form, solved by back-substitution

Equivalent Systems
- interchange rows
- multiply row by non-zero constant
- add multiple of one row to another

Example

$$2x_1 + x_2 + 4x_3 = -3$$
$$3x_1 - 2x_2 - 3x_3 = 5$$
$$x_1 + 2x_2 + 2x_3 = 6$$

- Rewrite in Row-Echelon form by manipulating equations towards stair-structure.

(Remember to make leading coefficients = 1)