

## Solving a System of Equations

ECON 441: Introduction to Mathematical Economics

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Given the system of equations:

$$4x_1 + 3x_2 = 28$$

$$2x_1 + 5x_2 = 42$$

Solve the above system of equations using matrix algebra. Start by writing out the equations in matrix format:

$$Ax = b$$

where  $A$  is the coefficient matrix,  $x$  is the vector of unknowns, and  $b$  is the vector of constants.

Then solve the equations using two methods:

1. Using the inverse of a matrix i.e.

$$x^* = A^{-1}b$$

2. Using Cramer's rule

$$x_k^* = \frac{|A_k|}{|A|}$$

Here,  $A_k$  is the matrix formed by interchanging the  $k^{th}$  column of  $A$  by  $b$ .