Solving a System of Two Equations Using Matrices

Name ______________________________

Date _________________ Period ______

Turning a system of equations into an augmented matrix.

$$3x - 4y = -2 \qquad -2x = 10 \qquad x + y = 8$$
$$-x + 3y = 4 \qquad 5x + y = -14 \qquad x - y = 6$$

$$\left[\begin{array}{cc|c} 3 & -4 & -2 \\ -1 & 3 & 4 \end{array}\right] \qquad \left[\begin{array}{cc|c} -2 & 0 & 10 \\ 5 & 1 & -14 \end{array}\right] \qquad \left[\begin{array}{cc|c} 1 & 1 & 8 \\ 1 & -1 & 6 \end{array}\right]$$

Row Operations can be performed on each row to manipulate the values in each row.

Three Row Operations

1. Interchange any two rows.
2. Replace a row by a nonzero multiple of that row.
3. Replace a row by the sum of that row and a constant nonzero multiple of some other row.

$$\begin{array}{c} r_1 \\ r_2 \end{array} \left[\begin{array}{cc|c} 3 & -4 & -2 \\ -1 & 3 & 4 \end{array}\right]$$

interchange r_1 with r_2

$$\begin{array}{c} r_1 \\ r_2 \end{array} \left[\begin{array}{cc|c} & & \\ & & \end{array}\right]$$

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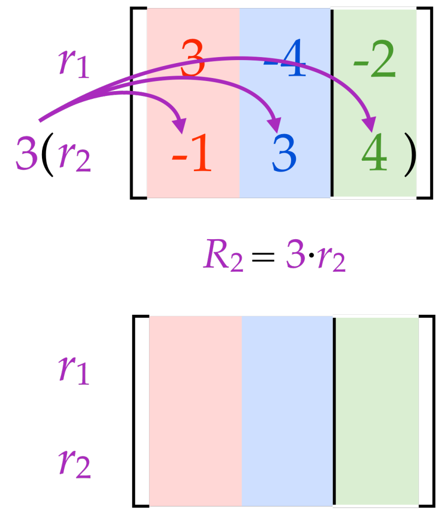

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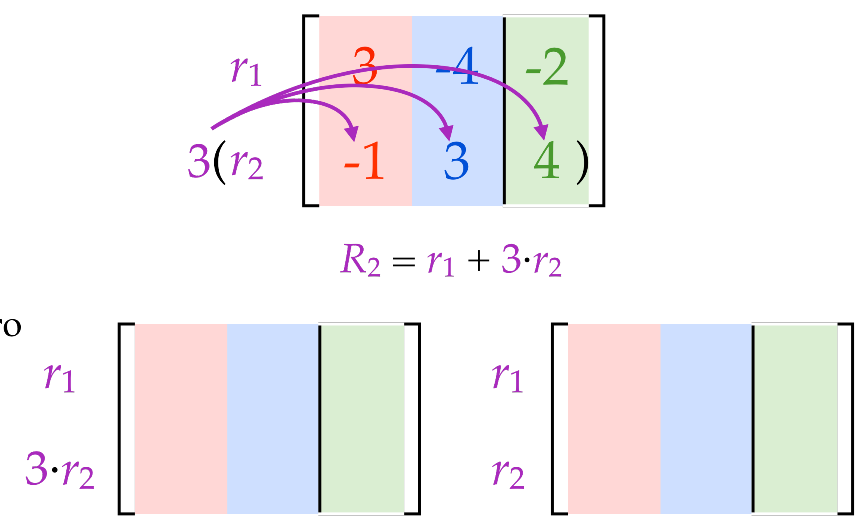

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Row Echelon Form

$$\left[\begin{array}{cc|c} 1 & a & d \\ 0 & 1 & e \end{array}\right]$$

create a diagonal of 1's
with 0's under the 1's

a, d, and e are constants that help us solve for our x and y variables.

Solve the following

$$2x + 4y = -8$$
$$x - 2y = 8$$

$$\left[\begin{array}{cc|c} 1 & a & d \\ 0 & 1 & e \end{array}\right]$$

Solve the following

$$3x - 4y = -2$$
$$-x + 3y = 4$$

$$\left[\begin{array}{cc|c} 1 & a & d \\ 0 & 1 & e \end{array}\right]$$

Solve the following

$$3x + 6y = 12$$
$$x + 2y = 4$$

$$\left[\begin{array}{cc|c} 1 & a & d \\ 0 & 1 & e \end{array}\right]$$

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