

9.8 Notes

Sec 1 H

More Solving Systems - Augmented Matrices

Unit 9

Ex. 3:

$$\begin{aligned} (5) \quad 2x + 8y &= 6 \\ (2) \quad -5x - 20y &= -15 \end{aligned} \quad \begin{array}{l} \div 2 \\ \div 5 \end{array} \left[\begin{array}{cc|c} 2 & 8 & 6 \\ -5 & -20 & -15 \end{array} \right] = \begin{array}{l} \div 5 \\ \div 5 \end{array} \left[\begin{array}{cc|c} 1 & 4 & 3 \\ -5 & -20 & -15 \end{array} \right]$$

$$\begin{array}{r} \cancel{10x} + \cancel{40y} = \cancel{30} \\ -\cancel{10x} - \cancel{40y} = -\cancel{30} \\ \hline 0 = 0 \end{array} \quad = \left[\begin{array}{cc|c} 1 & 4 & 3 \\ 0 & 0 & 0 \end{array} \right]$$

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Ex. 4:

$$\begin{aligned} 3x - 2y &= 2 \\ 5x - 5y &= 10 \end{aligned} \quad \begin{array}{l} \div 5 \\ \div 5 \end{array} \left[\begin{array}{cc|c} 5 & -5 & 10 \\ 3 & -2 & 2 \end{array} \right] = \begin{array}{l} \div 5 \\ \div 3 \end{array} \left[\begin{array}{cc|c} 1 & -1 & 2 \\ 3 & -2 & 2 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & -1 & 2 \\ 0 & 1 & -4 \end{array} \right] = \left[\begin{array}{cc|c} 1 & 0 & -2 \\ 0 & 1 & -4 \end{array} \right]$$

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Solve each system of equations using an augmented matrix.

Ex. 5

$$\begin{array}{l} 2x + 4y + 5z = 5 \\ x + 3y + 3z = 2 \\ 2x + 4y + 6z = 2 \end{array} \xrightarrow{(-2)} \begin{array}{cccc|c} -2 & -4 & -6 & -4 & \\ \hline 1 & 3 & 3 & 3 & 2 \\ 2 & 4 & 5 & 5 & 5 \\ 2 & 4 & 6 & 6 & 2 \end{array}$$

$$\begin{array}{cccc|c} 1 & 3 & 3 & 3 & 2 \\ 0 & -2 & -1 & 2 & 1 \\ 0 & -2 & 0 & 3 & -2 \end{array} \xrightarrow{\div: -2} \begin{array}{cccc|c} 1 & 3 & 3 & 3 & 2 \\ 0 & -2 & 0 & 3 & -2 \\ 0 & -2 & -1 & 2 & 1 \end{array}$$

$$\begin{array}{cccc|c} 1 & 3 & 3 & 3 & 2 \\ 0 & -2 & 0 & 3 & -2 \\ 0 & -2 & -1 & 2 & 1 \end{array} \xrightarrow{(-1)} \begin{array}{cccc|c} 1 & 3 & 3 & 3 & 2 \\ 0 & 1 & 0 & 3 & -2 \\ 0 & 0 & -1 & -1 & 3 \end{array}$$

$$\begin{array}{cccc|c} 1 & 3 & 3 & 3 & 2 \\ 0 & 1 & 0 & 3 & -2 \\ 0 & 0 & 1 & -1 & 3 \end{array}$$

$$\begin{array}{l} x = 8 \\ y = 1 \\ z = -3 \end{array}$$

$$x + 3y + 3z = 2$$

$$x + 3(1) + 3(-3) = 2$$

$$x + 3 - 9 = 2$$

$$x - 6 = 2$$