

Score:

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SM365 – Numerical Computing – Quiz 2 – Section 3.1 Gaussian Elimination

1. Set up an augmented matrix and use Gaussian elimination to solve the following systems of equations:

$$\begin{cases} \frac{1}{7}x + \frac{9}{49}y = \frac{16}{49} \\ \frac{1}{3}x + \frac{11}{9}y = \frac{14}{9} \end{cases}$$

$$\left[\begin{array}{cc|c} \frac{1}{7} & \frac{9}{49} & \frac{16}{49} \\ \frac{1}{3} & \frac{11}{9} & \frac{14}{9} \end{array} \right] \xrightarrow{R_1 \times 7} \left[\begin{array}{cc|c} 1 & \frac{9}{7} & \frac{16}{7} \\ \frac{1}{3} & \frac{11}{9} & \frac{14}{9} \end{array} \right]$$

$$\xrightarrow{R_2 - \frac{1}{3}R_1} \left[\begin{array}{cc|c} 1 & \frac{9}{7} & \frac{16}{7} \\ 0 & \frac{50}{63} & \frac{50}{63} \end{array} \right]$$

$$\begin{aligned} x + \frac{9}{7}y &= \frac{16}{7} \\ \frac{50}{63}x + \frac{9}{7}y &= \frac{16}{7} \end{aligned} \Rightarrow x = \frac{16}{7} - \frac{9}{7}y \Rightarrow \boxed{x=1}$$

$$\frac{50}{63}x = \frac{50}{63} \Rightarrow \boxed{y=1}$$