Question 1:

(a)[3] Determine an equation of the line through the points $(-2, 3)$ and $(-4, -7)$.

(b)[3] Determine whether the following lines are intersecting, parallel, or coincident:

$$\begin{aligned} L: & \quad 2x + 3y = -5 \\ M: & \quad 4x + 6y = -10 \end{aligned}$$

(c)[2] Determine the equation of the vertical line through the point $(11, -5)$.

(d)[2] Determine an equation of the line through the point $(11, -5)$ which is parallel to the line $7x - 4y = 1$.

Question 2:

(a)[4] Determine the point of intersection of the following pair of lines:

$$L: \quad 2x - 4y = -8$$
$$M: \quad 3x + 6y = 0$$

(b)[6] Eight hundred people attend a basketball game, and total ticket sales are \$3102. If adult tickets are \$6 and student tickets are \$3, how many adults and how many students attended the game?

Question 3:

(a)[6] At a price of $p = \$5$ the demand for a certain product is 12,000 units while the supply is 10,000. If price is increased by $1 demand decreases by 1200 while supply increases by 1000. What is the market price? (Round your final answer to two decimal places.)

(b)[4] Perform one row operation on the following matrix to put it in row echelon form, then determine how many solutions the corresponding system has. The answer is either one, zero, or infinitely many solutions; state which. (Note: you do not have to find the solutions, just say how many there are.)

$$\left[\begin{array}{ccc|c} 1 & 3 & 2 & 0 \\ 0 & 1 & -5 & 2 \\ 0 & -2 & 10 & -4 \end{array}\right]$$

Question 4:

(a)[5] Ned sells his prize tomatoes at the local farmers market on Saturday mornings. On a particular Saturday he must pay $100 to rent a space in the market for the day, and he also has to buy a new table at a cost of $25. Each tomato costs $0.20 to produce, and he has 160 available to sell. At what price should be sell the tomatoes to ensure that he breaks even? (Round your final answer to two decimal places.)

(b)[5] You have $12,000 to invest and three investments are available to you: one pays 4% per year, the second 5% per year, and the third pays 7% per year. Your goal is to receive an annual income of $625 per year from the investments, and you require that the amount invested at 7% be equal to the total invested in the other two investments. Set up a system of equations whose solutions would give the amounts to be invested at the different interest rates. DO NOT SOLVE THE SYSTEM OF EQUATIONS, simply set it up. Clearly describe each of the variables used.

Question 5 [10]: Solve the following system of equations **using matrix reduction** (no credit will be given for using any other method). Clearly state the row operations used at each step and clearly state the solution set.

$$2x - 3y + 4z = -15$$
$$x - y + z = -4$$
$$5x + y - 2z = 12$$