

Place your name on the back of this sheet of paper and nowhere else. Staple your answers face up on the front of this sheet of paper. Failure to follow these directions will cost you 10 points. If you use double-sided printing or print on the back of scrap paper, I will give you one additional point.

Show all work on all questions.

1) (20 points) Put the following equations in matrix form. Use row operations to solve the system. Find all solutions. $2X + 4Y - Z = 7$ $X + 2Y + Z = 8$ $-3X + 2Y + Z = 4$

2) (20 points) Put the following equations in matrix form. Use row operations to solve the system. Find all solutions. $3X - Z = 10$ $2Y + Z = 10$ $X + Y + Z = 0$

3) (20 points) Put the following equations in matrix form. Use row operations to solve the system. Find all solutions. $3X + 2Y + Z = 0$ $4X - Y + Z = 0$ $5X - 4Y + Z = 0$

4) (20 points) Put the following equations in matrix form. Use row operations to solve the system. Find all solutions. $2X + 3Y + Z = 2$ $4X - 2Y - 5Z = 4$ $8X + 4Y - 3Z = 0$

5) (20 points) Put the following equations in matrix form. Use row operations to solve the system. Find all solutions. $-3X + 2Y - Z = 0$ $2X - Y + 3Z = 0$ $-5X + 3Y + Z = 0$

This is the solution to the problem we did wrong in class on 3/4. I had miswritten the 16 in the first equation as 10. If I had written it correctly, your notes would have been:

$$Q_H + 16P_H + 2P_C = 300$$

$$Q_H - 20P_H = -100$$

$$Q_C + P_H + 2P_C = 100$$

$$Q_C - 3P_C = -10$$

Multiply Row 2 by -1 and add to Row 1 and multiply Row 4 by -1 and add to Row 3 gives:

$$36P_H + 2P_C = 400 \quad \text{Divide this by 2 and get } 18P_H + P_C = 200$$

$$Q_H - 20P_H = -100$$

$$P_H + 5P_C = 110$$

$$Q_C - 3P_C = -10$$

Multiply the new Row 1 by -5 and add to Row 3 and we get.

$$18P_H + P_C = 200$$

$$Q_H - 20P_H = -100$$

$$-89P_H = -890$$

$$Q_C - 3P_C = -10$$

As you can tell from Row 3, $P_H = 10$. Plug that into Row 1 and get $180 + P_C = 200$. So, $P_C = 20$. Plug those into Rows 2 & 4 to get $Q_H - 200 = -100$ and $Q_C - 60 = -10$. So $Q_H = 100$ and $Q_C = 50$.