

Place your name on the back of this sheet of paper and nowhere else. Staple your answers 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 write on the back of scrap paper, I will give you one additional point.

Show all work for all questions.

Do the calculations in all parts of Question #1 using the following matrices.

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 4 & 0 & -3 \\ 1 & 5 & -1 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 0 & 3 \\ 7 & 1 & 8 \\ 5 & 2 & -3 \end{bmatrix} \quad C = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \quad D = [10, 0, -1]$$

1A) (10 points) $2A - B$.

1B) (5 points) CD

1C) (5 points) DC

1D) (10 points) DB

1E) (10 points) AC

1F) (15 points) AB

1G) (15 points) BA

2) (30 points) Suppose that 30% of Bethany residents move to Wheeling in a particular year while 50% stay and 20% go to Pittsburgh. 80% of people from Pittsburgh stay there while 10% move to each of Wheeling and Bethany. 70% of people from Wheeling stay there and the rest move to Pittsburgh. Find the population matrix P and briefly state how you found it. If 1000 people start in Pittsburgh, 1000 in Wheeling, and 100 in Bethany, then how many will be in each location in one year? How many will be there in two years?