Instructions. Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Problem 1. (4 points) Compute AB and BA for

$$A = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

Solution.

$$AB = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} -1 & -2 \\ 3 & 4 \end{bmatrix}$$
$$BA = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 2 \\ -3 & 4 \end{bmatrix}$$

□

Problem 2. (4 points) Compute

$$t \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} - \begin{bmatrix} -11 & 4 & 8 \\ -10 & 3 & 8 \\ -6 & 2 & 5 \end{bmatrix}$$

Your answer should be a single matrix that has t's in it.

Solution.

$$t \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} - \begin{bmatrix} -11 & 4 & 8 \\ -10 & 3 & 8 \\ -6 & 2 & 5 \end{bmatrix} = \begin{bmatrix} t & 0 & 0 \\ 0 & t & 0 \\ 0 & 0 & t \end{bmatrix} - \begin{bmatrix} -11 & 4 & 8 \\ -10 & 3 & 8 \\ -6 & 2 & 5 \end{bmatrix}$$
$$= \begin{bmatrix} t+11 & -4 & -8 \\ 10 & t-3 & -8 \\ 6 & -2 & t-5 \end{bmatrix}$$

□

Problem 3. (2 points) How many Lowe's would a Rob Lowe rob if a Rob Lowe could rob Lowe's?

Solution. Any number in $[0, 2370]$ is reasonable. Any answer is acceptable. □