Quiz 4, MATH 240, Fall 2023

Write your name clearly.

Name:

UID:

(1) (8 points) If A and B are invertible matrices, and $AB\mathbf{x} = \mathbf{b}$, solve for $\mathbf{x}$.

$\vec{x} = B^{-1}A^{-1}\vec{b}$.

(2) (12 points) Consider the system of equations

$$x + 3y = 2,$$
$$-x - 4y = -1.$$

Use matrix inverses to solve for x and y (you *must* use matrix inverses here).

Let $A = \begin{pmatrix} 1 & 3 \\ -1 & -4 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$.

Then $\vec{x} = A^{-1}\vec{b}$

$$= \begin{pmatrix} 1 & 3 \\ -1 & -4 \end{pmatrix}^{-1} \begin{pmatrix} 2 \\ -1 \end{pmatrix}$$

$$= -\begin{pmatrix} -4 & -3 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ -1 \end{pmatrix}$$

$$= -\begin{pmatrix} -5 \\ 1 \end{pmatrix}$$

$$= \begin{pmatrix} 5 \\ -1 \end{pmatrix}.$$

So $x = 5$, $y = -1$.