

### QUIZ 3

1. (5 points) Let  $A = \begin{bmatrix} 8 & 5 \\ -7 & -5 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & -4 \\ 7 & -8 \end{bmatrix}$ . Find

- (1)  $A + B$
- (2)  $A^\top$
- (3)  $A^{-1}$
- (4)  $B^{-1}$
- (5)  $(AB)^{-1}$ .

2. (2 points) Find all  $\mathbf{x} \in \mathbb{R}^3$  that are mapped into the zero vector by the transformation  $\mathbf{x} \mapsto A\mathbf{x}$  for the given matrix  $A = \begin{bmatrix} 1 & 4 & 8 \\ 2 & 3 & 6 \end{bmatrix}$ .

3. (2 points) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation that maps  $\mathbf{e}_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  to  $\begin{bmatrix} 4 \\ 5 \end{bmatrix}$  and maps  $\mathbf{e}_2 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$  to  $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$ . use the fact that  $T$  is linear to find the images under  $T$  of  $\begin{bmatrix} 5 \\ 0 \end{bmatrix}$ ,  $\begin{bmatrix} 0 \\ 3 \end{bmatrix}$ ,  $\begin{bmatrix} 5 \\ 3 \end{bmatrix}$ . (Hint:  $5\mathbf{e}_1 = \begin{bmatrix} 5 \\ 0 \end{bmatrix}$ ,  $3\mathbf{e}_2 = \begin{bmatrix} 0 \\ 3 \end{bmatrix}$ )