Week 3 Day 1

Historical Figure

Make sure you know your neighbors' names. Then take about 2 minutes to discuss:

If you could meet any historical figure, who would you choose and why?

Readings This Week

- For Today: 1.9
- For Wednesday: 2.1
- For Friday: 2.2–3

Matrix of Linear Transformation

1. Find the standard matrix of the the linear transformation $T : \mathbf{R}^2 \to \mathbf{R}^2$ that rotates points $\pi/4$ radians clockwise and then reflects through the x-axis.

2. Find the standard matrix of the the linear transformation $T : \mathbf{R}^3 \to \mathbf{R}^4$ given by

$$T(x, y, z) = (x + y, x - z, y + z, x - z).$$

3. Which of the following is true?

(A) A linear transformation $T : \mathbf{R}^3 \to \mathbf{R}^2$ can never be one-to-one.

(B) A linear transformation $T : \mathbf{R}^2 \to \mathbf{R}^3$ can never be onto.

(C) Both of the above.

4. For which of the following matrices A is the corresponding linear transformation $T(\mathbf{x}) = A\mathbf{x}$ one-to-one?

(A) $\begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{bmatrix}$

(B) $\begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 3 & -1 \\ 0 & 1 & 0 \\ 1 & 4 & -1 \end{bmatrix}$

(D) None of the above OR more than one of the above