

HW3

- ① Download Moler's book. It is ~~not~~ full of applications of linear algebra, and I encourage you to read & download code outside of the part relevant to the present assignment. You will also find good tutorial bits on matlab.

Go to p48: 2×2 Matrix Transformations. Read till p56 and execute code described on p57-59.
You do not need to hand this portion with your assignment.

- ② Find A so that

$$A \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 3x_1 - 2x_2 \\ x_1 + 4x_2 \\ x_2 \end{bmatrix} \quad A \text{ is a matrix.}$$

- ③ T is a linear transformation, x_i $i=1,2,3$ are scalars, i.e. What is the matrix?

$$T(x_1, x_2, x_3) = (x_1 - 5x_2 + 4x_3, x_2 - 6x_3)$$

④ True or False. Justify your answer:

- (a) A linear transformation $T: \mathbb{R}^n \rightarrow \mathbb{R}^m$ is completely determined by its effects on the columns of an $n \times n$ identity matrix.
- (b) If $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ rotates vectors about the origin through an angle θ , then T is a linear transformation.
- (c) When 2 linear transformations are performed, one after the other, it doesn't matter in which order these are done, the results are the same.