The matrix for the transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ that reflects across the line $y = x$ is given by

$$A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

(a) True, and I can explain why

(b) True, but I am unsure why

(c) False, and I can explain why

(d) False, but I am unsure why

(e) Errr. . .

The matrix for the transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ that rotates about the origin by $\frac{\pi}{2}$ radians clockwise is given by

$$A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

(a) True, and I can explain why

(b) True, but I am unsure why

(c) False, and I can explain why

(d) False, but I am unsure why

(e) Errr. . .

The matrix for the transformation $T : \mathbb{R}^3 \to \mathbb{R}^3$ that rotates about the x-axis by $\frac{\pi}{2}$ radians counterclockwise is given by

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix}$$

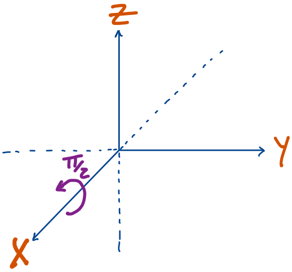
(a) True, and I can explain why

(b) True, but I am unsure why

(c) False, and I can explain why

(d) False, but I am unsure why

(e) Errr. . .



For each transformation T, find the corresponding matrix A

1. $T : \mathbb{R}^2 \to \mathbb{R}^2$ stretches horizontally away from the y-axis by a factor of 2
2. $T : \mathbb{R}^2 \to \mathbb{R}^2$ rotates by $\frac{\pi}{3}$ counter-clockwise and then reflects across the x-axis
3. $T : \mathbb{R}^2 \to \mathbb{R}^2$ rotates by $\frac{\pi}{4}$ clockwise and then stretches horizontally away from the y-axis by a factor of 3
4. $T : \mathbb{R}^3 \to \mathbb{R}^3$ projects onto the yz-plane

Note you can use the *Mathematica* notebook sep12.nb from Tuesday to verify your answers for 1, 2, and 3.