1) Write down a matrix for a linear transformation of $\mathbb{R}^2$ that is a stretching in the $x$ direction by a factor of 2 followed by a counterclockwise rotation by $\pi/2$ radians.

2) Write down a $3 \times 3$ matrix for a linear transformation of $\mathbb{R}^3$ that rotates the cube with vertices at $(\pm 1, \pm 1, \pm 1)$ about the axis $y = x = z$ by $2\pi/3$ radians. (Either direction is fine).

3) In problem 12 from 1.10, what happens after 10 days? 20 days? What is the long term behavior?