Homework 7 & 8

Due: Thursday, June 15

For each of the following matrices:

- (Optional) *Describe* the corresponding linear transformations.
- Write down the corresponding system of differential equations.
- Find the general solution.
- Sketch a phase portrait of the corresponding system.

(Assume that $a, b > 0$ are distinct positive constants and $\theta \in [0, 2\pi]$.)

1. $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$
2. $\begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$
3. $\begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix}$
4. $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$
5. $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$
6. $\begin{bmatrix} 0 & 2 \\ -2 & -2 \end{bmatrix}$
7. $\begin{bmatrix} 0 & 2 \\ -2 & 2 \end{bmatrix}$
8. $\begin{bmatrix} 0 & 0 \\ a & b \end{bmatrix}$
9. $\begin{bmatrix} 0 & a \\ 0 & b \end{bmatrix}$
10. $\begin{bmatrix} 1 & 0 \\ a & 1 \end{bmatrix}$
11. $\begin{bmatrix} a & b \\ b & a \end{bmatrix}$
12. $\begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & -\cos\theta \end{bmatrix}$