1. Exercise 7, page 43
2. Exercise 8, page 45
3. Express \( e^{tA} \) in terms of \( A \) for
\[
A = \begin{bmatrix}
-1 & -1 & -4 \\
-1 & -1 & -4 \\
-4 & -4 & 2
\end{bmatrix}
\]
4. Sketch all the possible phase portraits of the system
\[
x' = ax - 2y, \quad y' = 3x - y
\]
as the parameter varies from \(-\infty < a < \infty\).
5. Sketch the phase portrait for the three-d system:
\[
x' = -x + 4y \\
y' = -y - 4x \\
z' = z
\]