Homework #10 **Math 527, UNH fall 2015**
Due Tuesday, Dec. 8 in recitation.

Problems 1-6. Find the general solution of the system of equations. For problems with complex eigenvalues, express your answer in both complex and real-valued form. Prime notation means differentiation in t, i.e. $x' = dx/dt$.

1. $x' = x + 2y$
$y' = 4x + 3y$

2. $x' = -4x + 2y$
$y' = -\frac{5}{2}x + 2y$

3. $x' = x + y$
$y' = -2x - y$

4. $x' = 5x + y$
$y' = -2x + 3y$

5. $x' = -x + 3y$
$y' = -3x + 5y$

6. $x' = 12x - 9y$
$y' = 4x$

Problem 7. Solve the initial value problem.

$$\begin{aligned} x' &= -3x - y \\ y' &= 9x - 3y \\ x(0) = 3,\ & y(0) = 5. \end{aligned}$$

Problem 8. Find the general solution.

$$\begin{aligned} x' &= 2x + 4y + 4z \\ y' &= -x - 2y \\ z' &= -x - 2z \end{aligned}$$

Most problems adapted from Section 8.2 of Zill's "First Course in Differential Equations," 9th edition.