

**Math 106A. Fall 2008. M. Zhitomirskii**  
**Homework 7. 2 problems. Due on Monday, December 1, 9:30 am**

1. For each of the following matrices  $A$ , find  $e^A$ .

1.1.  $A = \begin{pmatrix} 0 & 2 & 3 & 6 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 0 \end{pmatrix}$

1.2.  $A = \begin{pmatrix} 0 & 1 \\ 3 & -2 \end{pmatrix}$

1.3.  $A = \begin{pmatrix} 1 & -2 \\ 5 & 3 \end{pmatrix}$

1.4.  $A = \begin{pmatrix} 0 & 1 & 5 \\ 3 & -2 & 7 \\ 0 & 0 & 2 \end{pmatrix}$

2. For  $A$  in problems 1.2 and 1.3, find  $e^{At}$ . Also, give an explicit formula for the solution of the system  $X' = AX$  satisfying the initial condition  $X(0) = \begin{pmatrix} a \\ b \end{pmatrix}$ .