Final Exam
Linear Algebra, Section 003 (TR 11am – 12:15pm), Dave Bayer, May 8, 2012

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<table>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>Total</td>
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</tbody>
</table>

Please draw a box around your final answer. Please use each printed sheet (front and back) only for that problem, not for any other problem. There are blank sheets at the end of the exam, to give you more room to work. However, your final answer will not be graded unless it appears on the same sheet (front or back) as the printed problem.

[1] Find $A^n$ where $A$ is the matrix

$$
\begin{bmatrix}
3 & 3 \\
4 & -1
\end{bmatrix}
$$
[2] Find $A^n$ where $A$ is the matrix

$$
\begin{bmatrix}
5 & 2 \\
2 & 5
\end{bmatrix}
$$
[3] Find $e^{A_1}$ where $A$ is the matrix

$$
\begin{bmatrix}
2 & -1 \\
4 & 6
\end{bmatrix}
$$
[4] Find $e^{At}$ where $A$ is the matrix

$$
\begin{bmatrix}
-1 & 1 \\
3 & -3 \\
\end{bmatrix}
$$
[6] Convert the differential equation $y'' - 4y' + 3y = 0$ to matrix form, and solve by exponentiating.
[7] Find $e^{A_1}$ where $A$ is the matrix

$$
\begin{bmatrix}
1 & 0 & 1 \\
2 & -1 & -2 \\
0 & 0 & 2
\end{bmatrix}
$$
[8] Find $e^{At}$ where $A$ is the matrix

\[
\begin{bmatrix}
0 & 4 & -4 \\
2 & -2 & 1 \\
3 & -6 & 5
\end{bmatrix}
\]