Honors Trig/Pre-Calculus   Matrices—No Calculator!!   Name:

1. Write a 2 x 2 identity matrix <u>and</u> a 3 x 3 identity matrix.

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2. Let $M=\begin{bmatrix}1 & -3\\ 2 & 0\end{bmatrix}$ $N=\begin{bmatrix}-6 & 3\\ 8 & 20\end{bmatrix}$

Solve the following using the given matrices. ***Show all steps!***

a. M^2 b. det M c. M^{-1} d. $M^{-1}M$ e. det N f. N^{-1} g. NN^{-1}

h. Find matrix X such that: N + X = 2M   i. Solve for matrix X: 5X – M = N

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3. Let $A=\begin{bmatrix}1 & 3 & 2\\ -1 & 2 & -1\\ 2 & -2 & 3\end{bmatrix}$ $B=\begin{bmatrix}2 & -3 & 2\\ 1 & 0 & -1\\ 4 & 5 & 3\end{bmatrix}$ $C=\begin{bmatrix}2\\ 3\\ -1\end{bmatrix}$

Solve the following using the given matrices. ***NOTE: show work for all parts except e & f.***

a. AC b. B^2 c. CB d. BC e. BB^{-1} f. $A^{-1}A$ g. det A

OK to just write answer for e & f

Clearly show all steps for #4-6.

4. A 2 x 2 matrix is defined as $T=\begin{bmatrix}x & 2\\ 3 & y\end{bmatrix}$. Find the values of x and y if $T^2=\begin{bmatrix}7 & 16\\ 24 & 87\end{bmatrix}$.

5. Let $P=\begin{bmatrix}1 & 4\\ -2 & 3\end{bmatrix}$ and $O=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$. Given that $P^2 - 4P + kI = O$, find k.

> ***NOTE: I* = identity matrix**
> **k is a scalar**

6. Let $R=\begin{bmatrix}-1 & 7\\ 6 & -2\end{bmatrix}$ and $O=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$. Given that $R^2 + 3R + kI = O$, find k.

CHECK YOUR ANSWERS:

$-\frac{1}{144}\begin{bmatrix}20 & -3\\ -8 & -6\end{bmatrix}$ $\frac{1}{6}\begin{bmatrix}0 & 3\\ -2 & 1\end{bmatrix}$ $\begin{bmatrix}-5 & -3\\ 2 & -6\end{bmatrix}$ $\begin{bmatrix}-1 & 0\\ 2 & 4\end{bmatrix}$ $\begin{bmatrix}8 & -9\\ -4 & -20\end{bmatrix}$ $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

$\begin{bmatrix}-7\\ 3\\ 20\end{bmatrix}$ $\begin{bmatrix}9\\ 5\\ -5\end{bmatrix}$ $\begin{bmatrix}9 & 4 & 13\\ -2 & -8 & -1\\ 25 & 3 & 12\end{bmatrix}$ $\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$ $\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$ $\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$

-144   -40   -1   3   6   9   11   not possible