Chapter 7.2, 7.3 Review Name_____
Matrices

For 1-5, complete the matrix operation. If it is not possible, write "not possible". No Calculator.

1. $\begin{bmatrix} 5 & 6 & 1 & 0 \\ 2 & -2 & 3 & 4 \\ 1 & 5 & -2 & 1 \end{bmatrix} - \begin{bmatrix} 1 & 4 & -1 & 1 \\ -2 & 0 & 5 & 8 \\ 10 & -3 & 5 & 7 \end{bmatrix} =$

2. $4\begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix} + \begin{bmatrix} 7 & 9 \\ -1 & 1 \end{bmatrix} =$

3. $\begin{bmatrix} 4 \\ 5 \end{bmatrix}\begin{bmatrix} 5 & 3 & -1 & 2 \end{bmatrix} =$

4. $\begin{bmatrix} 3 & 2 & -1 & 0 & 4 \\ 5 & 9 & -2 & -3 & 5 \\ 1 & 0 & -4 & -1 & 3 \\ 7 & 8 & 1 & 2 & 4 \\ 0 & -3 & 4 & -3 & 1 \\ 8 & 10 & -2 & 1 & 4 \end{bmatrix}\begin{bmatrix} 3 & 5 \\ 4 & -1 \end{bmatrix} =$

5. $\begin{bmatrix} -1 & 2 & 0 \\ 4 & 1 & -2 \\ 3 & 7 & -1 \end{bmatrix}\begin{bmatrix} -1 & 2 \\ 0 & 1 \\ 3 & 4 \end{bmatrix} =$

For 6-8, determine if the inverse of the matrix exists. If it does exist, find it! (#6 and #7 No Calculator, #8 Calculator OK)

6. $\begin{bmatrix} 2 & -1 \\ 4 & -2 \end{bmatrix}$

7. $\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$

8. $\begin{bmatrix} 4 & -1 & 3 \\ 2 & 1 & 4 \\ 5 & -2 & 0 \end{bmatrix}$

9. Explain in words how you would prove that two matrices are inverses of each other.

10. Explain in words what the "identity matrix" is.

For 11-13, solve the system of equations using matrices (Calculator OK). You must use each method at least once (Inverses and Reduced Row Echelon Form).

11. $\begin{aligned} 2x-3y&=-10 \\ x+2y&=16 \end{aligned}$

12. $\begin{aligned} x+y+z&=2 \\ 2x-3y+z&=-5 \\ 3x+2y+4z&=3 \end{aligned}$

13. $\begin{aligned} x+y+z&=-2 \\ 2x+z&=-1 \\ 3y+3z&=-12 \end{aligned}$

14. Mrs. Billz has paper money in her wallet consisting of $1 bills, $5 bills, $10 bills, and $20 dollar bills. On Friday she had 19 total bills in her wallet that adds up to $125. She also has one more $10 bill than the total number of $5 bills. The number of $20 bills is equal to the number of $5 bills minus the number of $1 bills. How many of each type of bill does she have?

15. The Gaussians Math team has made it to State! After they compete at State, they take home a total of 10 trophies (1^{st}, 2^{nd}, and 3^{rd} place finishes in each event earns the team a trophy). The number of 1^{st} place trophies is the same as the number of 2^{nd} and 3^{rd} place trophies combined. Also, the number of 1^{st} place trophies is one less than twice the number of 2^{nd} place trophies. How many 1^{st}, 2^{nd} and 3^{rd} place trophies do they take home?