Inverse of a Matrix   Name: _____

Multiply to determine if the two matrices are inverses of each other.

1) $\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}\begin{bmatrix} 1 & -1 \\ -1 & 0 \end{bmatrix}$

Find the inverse of each matrix if it exists. Complete #'s 2-5 by hand.

2) $\begin{bmatrix} 6 & 2 \\ -1 & 5 \end{bmatrix}$

3) $\begin{bmatrix} 4 & 0 \\ 7 & 5 \end{bmatrix}$

4) $\begin{bmatrix} 2 & 12 \\ 1 & 6 \end{bmatrix}$

5) $\begin{bmatrix} 3 & 0 \\ 1 & -2 \end{bmatrix}$

6) *B* is the inverse of $\begin{bmatrix} -1 & 6 \\ 4 & 3 \end{bmatrix}$. What is entry b_{11} ?

Solve the following system of equations using a matrix equation.

7) $\begin{cases} x - y = 5 \\ 2x - y = 6 \end{cases}$

Write and solve the matrix equation that represents the system. *Identify your variables.*

8) A game show host says that he has $5000 in $50 bills and $100 bills and he will give you the $5000 if you can tell him how many of each type of bill he has. He gives you a hint that he has 73 bills in all. How many of each bill does the game show host have?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Space	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

9) The matrix $\begin{bmatrix} 1 & -2 & 3 & 0 \\ 2 & 4 & -2 & -3 \\ 1 & -1 & 2 & 1 \\ -2 & -1 & 0 & 1 \end{bmatrix}$ was used to encrypt a message sent by Morpheus to Neo in the Matrix movie. The encoded message Neo received was the matrix: $\begin{bmatrix} 24 & 32 & 19 & -4 \\ 24 & 13 & -38 & -28 \\ 43 & 38 & 26 & 10 \\ -35 & -19 & 4 & 10 \end{bmatrix}$. Decode this message.

10) Neo used the matrix $\begin{bmatrix} -1 & 3 \\ 4 & -2 \end{bmatrix}$ to send the encrypted message $\begin{bmatrix} 15 & 15 & -1 & 32 & 42 & -5 \\ 20 & -10 & 4 & 22 & -28 & 70 \end{bmatrix}$. What did Neo's message say?