# A2H NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Matrix Activities #1 Period \_\_\_\_\_\_

**Part 1** The Identity Matrix. Evaluate each of the following. You may use your calculator, but you may also find that it is faster to *not* to use it for the 2x2 matrices.

**1.  2.  3. **

In problems 1-3 you multiplied by 2x2 and a 3x3 ***IDENTITY MATRIX***. Answer the following:

**4.** What is an identity matrix? (What does it look like?)

**5.** What happens when you multiply by an identity matrix?

**Part 2** Inverse Matrices. Evaluate each of the following, then answer the follow-up questions.

**6.  7. **

**8.** In both cases what did you get for an answer?

When the product of two matrices (IN EITHER ORDER) results in an identity matrix, then

they are called ***INVERSES***.

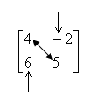
Finding the inverse for a large matrix is difficult, but it is simple for a 2x2 matrix.

**9.** Follow the following steps to find the inverse of the given matrix

Rules Sample Your Problem:

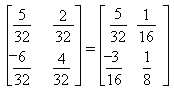
** **

1. Find the determinant 



Swap the upper left and lower right number, change the signs on the lower left and upper right numbers.

2.



3. Divide each entry in this

new matrix by the

determinant

**10.**  How can you check to see if your inverse matrix is correct?

**For each of the following, find the inverse matrix.**

**11.  12.  13. **

**Part 3** Find the inverse of a matrix with your calculator.

\* Enter the original matrix in question #12 into your calculator as matrix [A]



\* Find the button on your calculator. **This button does not raise a value to the -1 power, it is a symbol for an *inverse*.**

\* Enter [A] and press enter. What do you get?

(It should be the same as your answer to #12)

Use your calculator to find the inverse of each of the following matrices

14.   **15.  16.  17. **

\*Convert to fractions by hitting “math”, “enter”, “enter”.

**18.** Which of these did not work?

**19.** What did the calculator say when you tried it?

**20.** What is different about this matrix that keeps us from finding an inverse?

**Part4** Determining if matrices are inverses.

Use your calculator to multiply each of the following.

Write the resulting matrix

Sate if the matrices are “inverses” or “not inverses”

**21.  22.  23. **

# A2H NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Matrix Activities #2 Period \_\_\_\_\_\_

**Part 5** Solving a system of equations with inverse matrices. Follow the example to solve this system using inverse matrices.

Steps Sample Problem Your Problem

1 Rewrite the system as a matrix

Equation.

2a Use your calculator to find the

inverse of the coefficient matrix.

2b Enter the inverse matrix in your

calculator as [A]

2c Enter the answer matrix into your

calculator as [B].

3. Multiply the inverse matrix and the

answer matrix. [A]x[B].

\*The answer matrix must come

second!!

4. The resulting matrix is the answer.

The top number is x, and the

bottom is y.











STOP!! Wait for directions before going past this point!!!

**Follow the directions below for each of the following systems of equations**

**24.**  **25.**  **26.** 

A) A) A)

B) B) B)

D) x= y= D) x= y= D) x= y= z=

A) Rewrite each system as a matrix equation.

B) Write the inverse of the coefficient matrix.

C) Multiply the inverse of the coefficient matrix by the answer matrix

D) Identify the solutions.

**Part 6** CODING AND DECODING AN ENCRYPTED MESSAGE.

27. Decode the encrypted message by following the steps and example.

Steps Sample Problem Your Problem



**Encryption key:**  **Encryption key:** 

Message: 26, 45, 60, 100, 29, 50, 52, 92 29, 44, 64, 100, 54, 90, 39, 60, 79, 128

1 Write the message as a

series of 1x2 Matrices.

2 Find the inverse of the

encryption key.

3 Multiply each coded

matrix by the inverse of the

encryption key

4 Each number represents a

letter

0=<space>, 1=A, 2=B, 3=C….







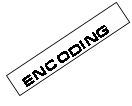
7 5 20 0 8 5 12 16

G E T \_ H E L P

**ENCODING A MESSAGE IS MUCH EASIER**

Steps Sample Problem Your Problem

Encryption key:  Encryption key: 



UNCODED MESSAGE: UNCODED MESSAGE:

C O O K I E B U R G E R

1 Write the message using the

basic code 1=A, 2=B, 3=C….

2 Rewrite the message as 1x2

matrices

3 Multiply each matrix by the

encryption key

4 Write the code without the matrices

3 15 15 11 9 5





60 99 108 175 60 97

1. Write your encryption code:
2. Write your message:
3. Encrypt your message:
4. Write your encrypted message

this way:

OPENER:

1. Solve this system of equations:

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2 A) What do you want to do for a

living when you grow up?

B) What is the worst present you

have ever received?

C) What are excited about eating

this holiday?

D) What nickname do you wish you

had? (Keep ‘em clean)