**Activity 8.3.4 Am I your Inverse?**

For real numbers, the multiplicative inverse of a number gives 1 (the identity) when multiplying the original number. Example, the multiplicative inverse of

1. With real numbers, we call the multiplicative inverse the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Also if

**We saw in investigation 1 that some matrices have inverses.**

As with real numbers, for two matrices, if

1. What does that mean in terms of the shape and size of *A* and *B*?
2. Now let’s practice multiplying matrices to see if two matrices are inverses. Let:

Use technology to find the following product matrices:

1. So which matrix is
2. Use technology to find the inverses of matrices, B, C and D.
3. Did all the matrices have a multiplicative inverse?
4. We can use some algebra to see if has an inverse matrix.
5. Where did the 4 equations come from?
6. Solve the system. Does A have an inverse?

If a matrix *A* has an inverse, we call the inverse , and . A matrix can only have an inverse if it is a square matrix. Not all square matrices have inverses. A matrix that has an inverse is called a ***nonsingular matrix.*** A matrix that does not have an inverse is called a ***singular matrix.*** We will find the inverse of a matrix (if it has one) first using the graphing calculator and then in later investigations by hand.