Here are a couple of hints to Homework 5. Enjoy!

**SECTION 2.1: MATRIX OPERATIONS**

Remember the rule \((m \times n) \bullet (n \times p) = (m \times p)\).

2.1.11. \(D = 2I\) works!

2.1.15.
(a) \(F\) (oh, life would be awesome if this was true! But \(a_1a_2\) doesn’t even make sense!)
(b) \(F\) (the columns of \(A\) using weights from the column of \(B\))
(c) \(T\)
(d) \(T\)
(e) \(F\) (in the reverse order, \((AB)^T = B^TA^T\))

2.1.23. Multiply the equation \(Ax = 0\) by \(C\).

2.1.27. First figure out the size of your matrix.

**SECTION 2.2: THE INVERSE OF A MATRIX**

2.2.1. Use theorem 4.

2.2.9. All statements are true, except for (b), because \((AB)^{-1} = B^{-1}A^{-1}\)
and (c) (should be \(ad - bc \neq 0\), take \(A = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}\) as an example)

2.2.13. Multiply both sides to the left by \(A^{-1}\). This is definitely not true in general (take \(A = O\) for example; there are many other examples)

2.2.21. In other words, you have to show that the only solution to \(Ax = 0\)
is \(x = 0\) (think about this in terms of linear combinations of the columns of \(A\)). For that, multiply the equation \(Ax = 0\) by \(A^{-1}\).
2.2.38.

\[
D = \begin{bmatrix}
1 & 0 \\
0 & 0 \\
0 & 0 \\
0 & 1 \\
\end{bmatrix}
\]

The best way to get \(D\) is by using the equation \(AD = I_2\) and guessing!

\(C\) cannot exist, because otherwise \(A\) would be invertible, and in particular its columns would be linearly independent, which is bogus!