

#ret

1 | Exercises

1.1 | 1.A.2

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1.2 | 1.A.10

$$\begin{aligned}
 (4, -3, 1, 7) + 2(x_1, x_2, x_3, x_4) &= (5, 9, -6, 8) \\
 4 + 2x_1 &= 5, \\
 -3 + 2x_2 &= 9, \\
 1 + 2x_3 &= -6, \\
 7 + 2x_4 &= 8
 \end{aligned}$$

\[\]

\] Not sure how to do this with matrices?

$$x = \left(\frac{1}{2}, 6, \frac{-7}{2}, \frac{1}{2}\right)$$

1.3 | 1.A.15

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2 | Matrices for Solving Systems

I'm not sure what I should notice, although it's interesting that they are all 2×2 matrices that are (or can be decomposed into) one number away from the identity. I think we mentioned that they were "essential matrices" or something?

3 | Geometric Interpretation of Dot Product

We talked about it in class, and learned it in physics, but a dot product $A \cdot B$ can be interpreted as the magnitude of A 's projection onto B multiplied by the magnitude of B . $A \cdot B = |A||B|\cos\theta$.

4 | Dot Product on Vectors as a Group

No. Dot product returns a scalar, which means that this operation is distinctly not closed.

After class on 3 Sep, Daniel mentioned that it might be a group if you define a modified dot product where you take the normal dot product and put it in the direction of the second vector. However, this doesn't work because for any given $N \times 1$ matrix A the identity e has to satisfy $A \cdot e = e \cdot A = A$. Thus, the definition that relies on the direction of the second operand will break when the identity is on one of the sides. *Because dot product relies on the angle between the two vectors, I think it would be difficult to find an angle for an identity vector that works with all other angles of vectors. I'm not sure how to formalize this...* #todo

5 | Inverse of a matrix

I tried this for the previous homework when we were to determine if 2×2 matrices were groups under multiplication, but didn't end up getting anywhere. I will try again...

srcIdentityMatrixFormula.png

I got something like $w = \frac{1 - \frac{bc}{bc-ad}}{a}$, which I don't think is correct. It's also been an hour and a half, so I think I'll have to leave this here for now. #todo
