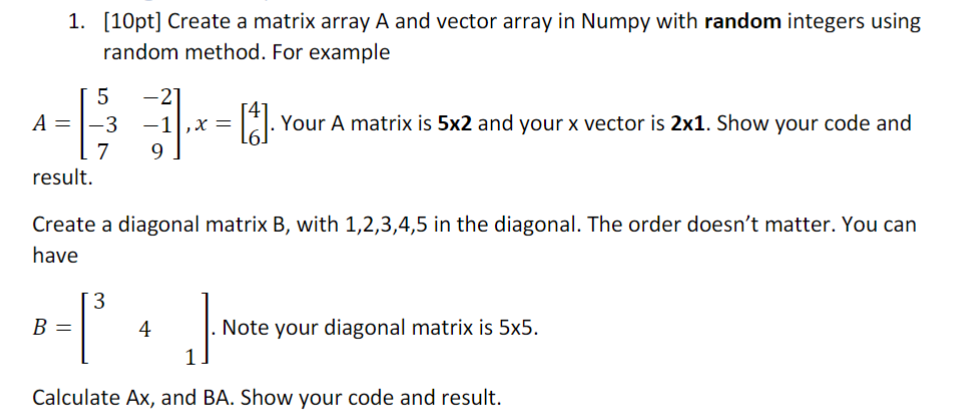
# **Assignment 1: Linear Algebra, Probability and Statistics**

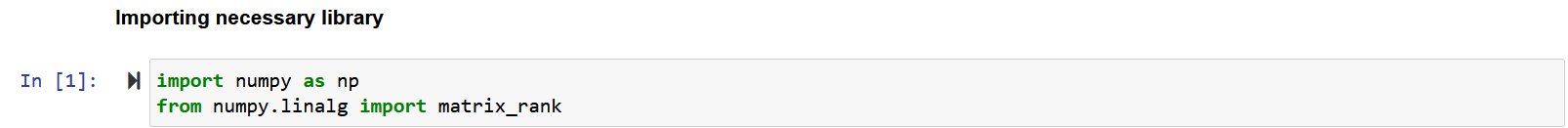
**Tapaswi Satyapanthi**

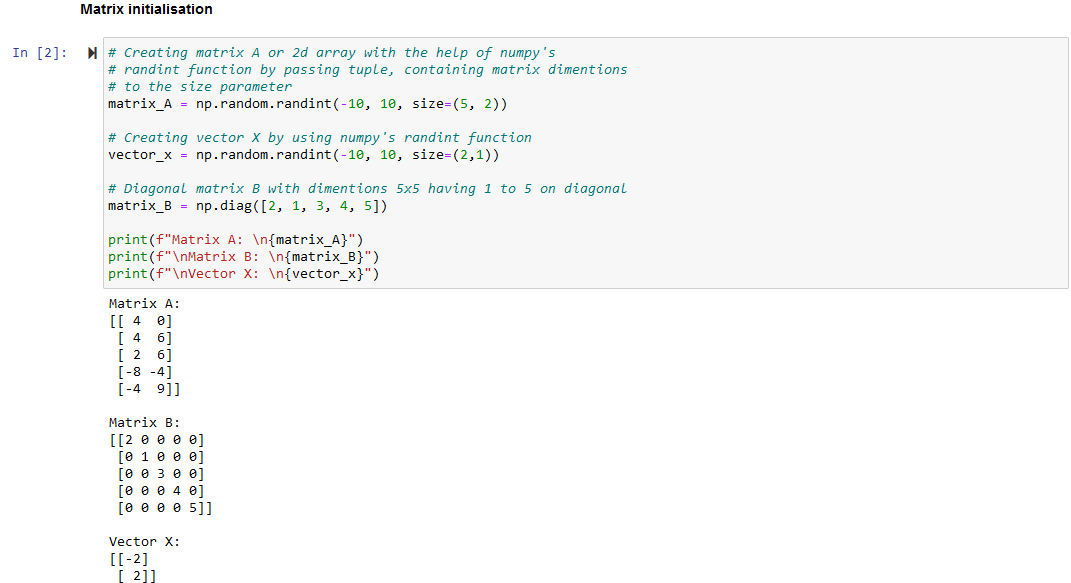
[**satyapanthi.t@northeastern.edu**](mailto:satyapanthi.t@northeastern.edu)

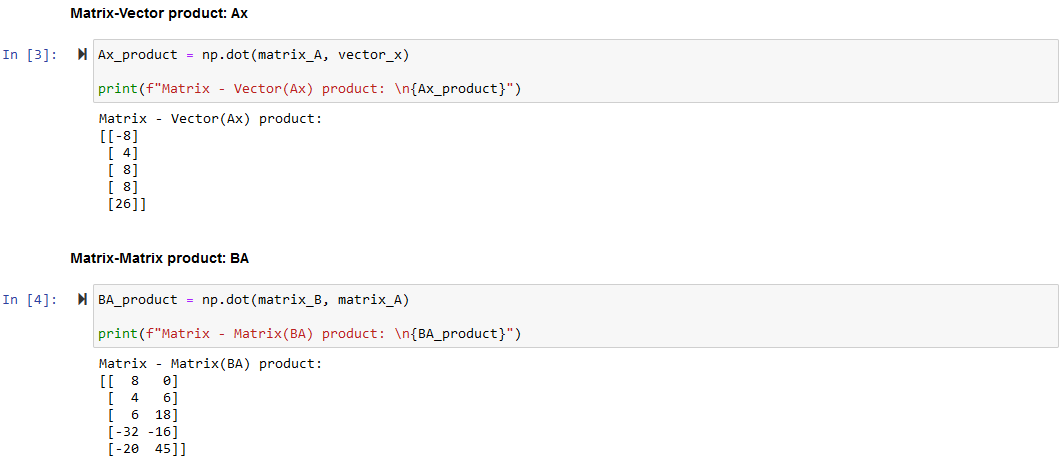
## **Question 1**



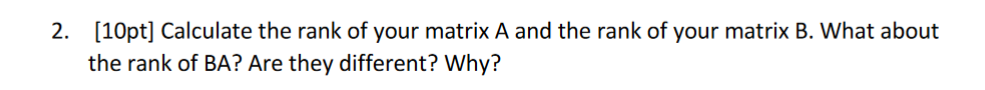
**Code with Result:**

****

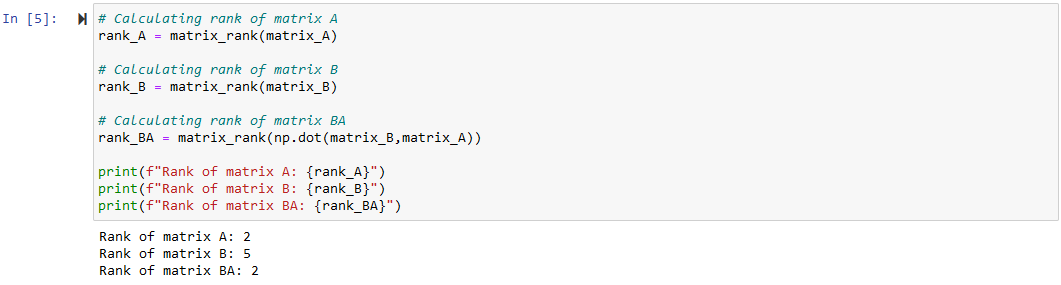
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## **Question 2**

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**Code with Result:**



**What about the rank of BA? Are they different? Why?**

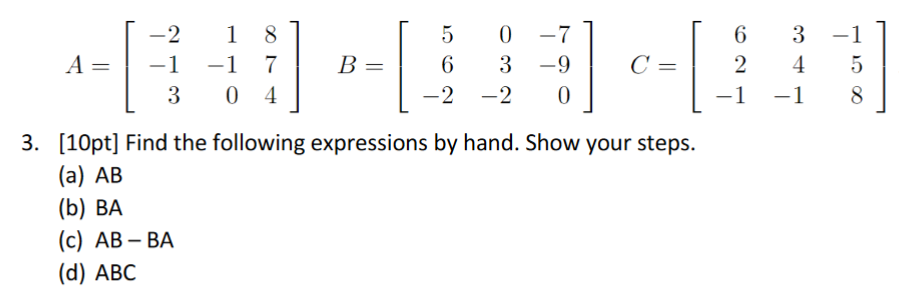
Here rank of the matrix *BA* is not equal to the rank of matrix *B* but equal to the rank of matrix *A* because the *rank(BA)* is determined by the following relationship:

*rank(BA)* is minimum of the ranks of the matrices *B* and *A* i.e. *rank(BA) <= minimum(rank(B), rank(A))*

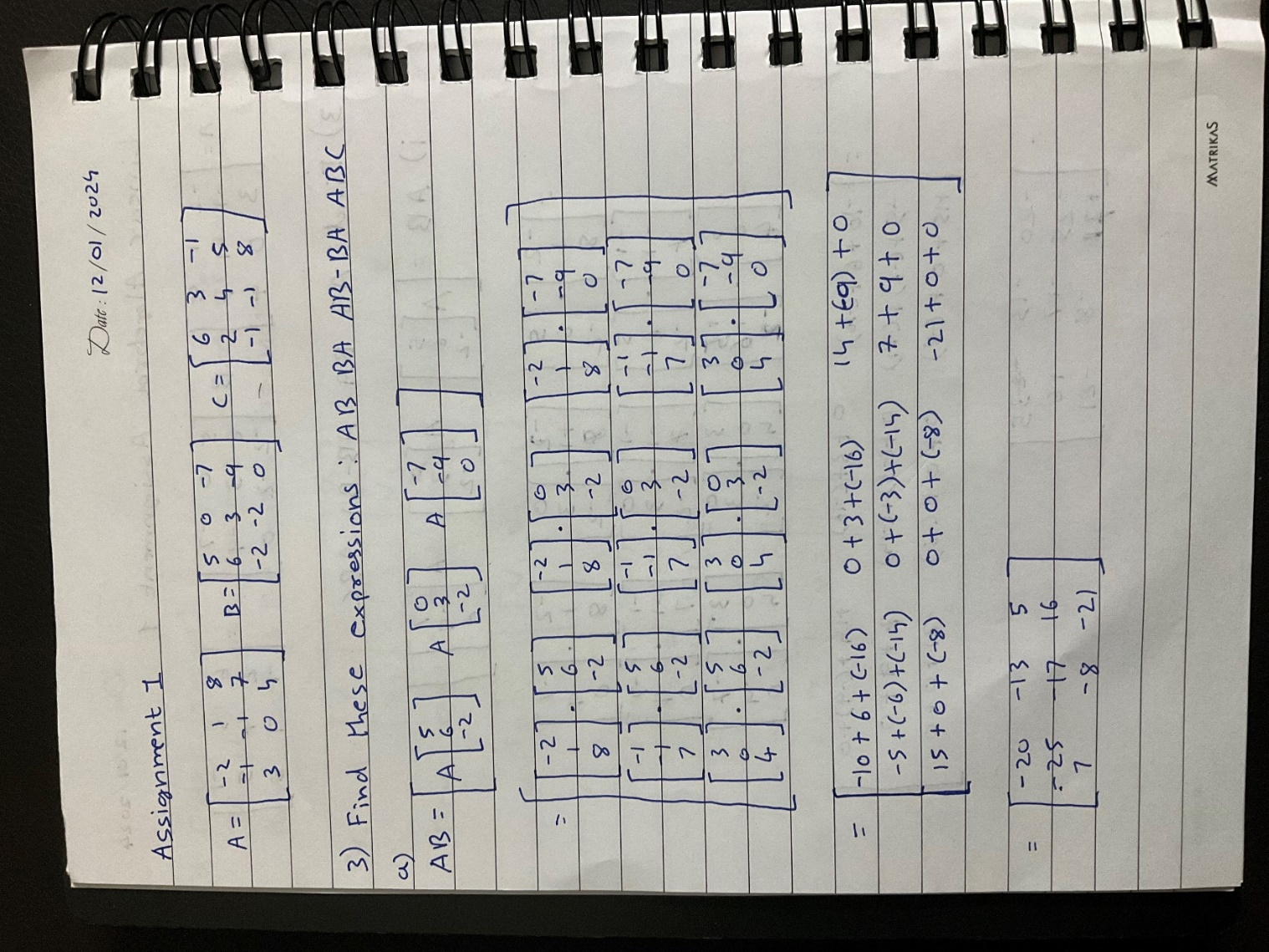
Hence, the rank of matrix *BA* will not be *5*, same as matrix *B*, because the minimum of the ranks of *B* and *A* is *2*, the rank of the matrix *A*.

So, the rank of the matrix *BA* *<= rank of A*, in this case equal to *A*, i.e. *2*.

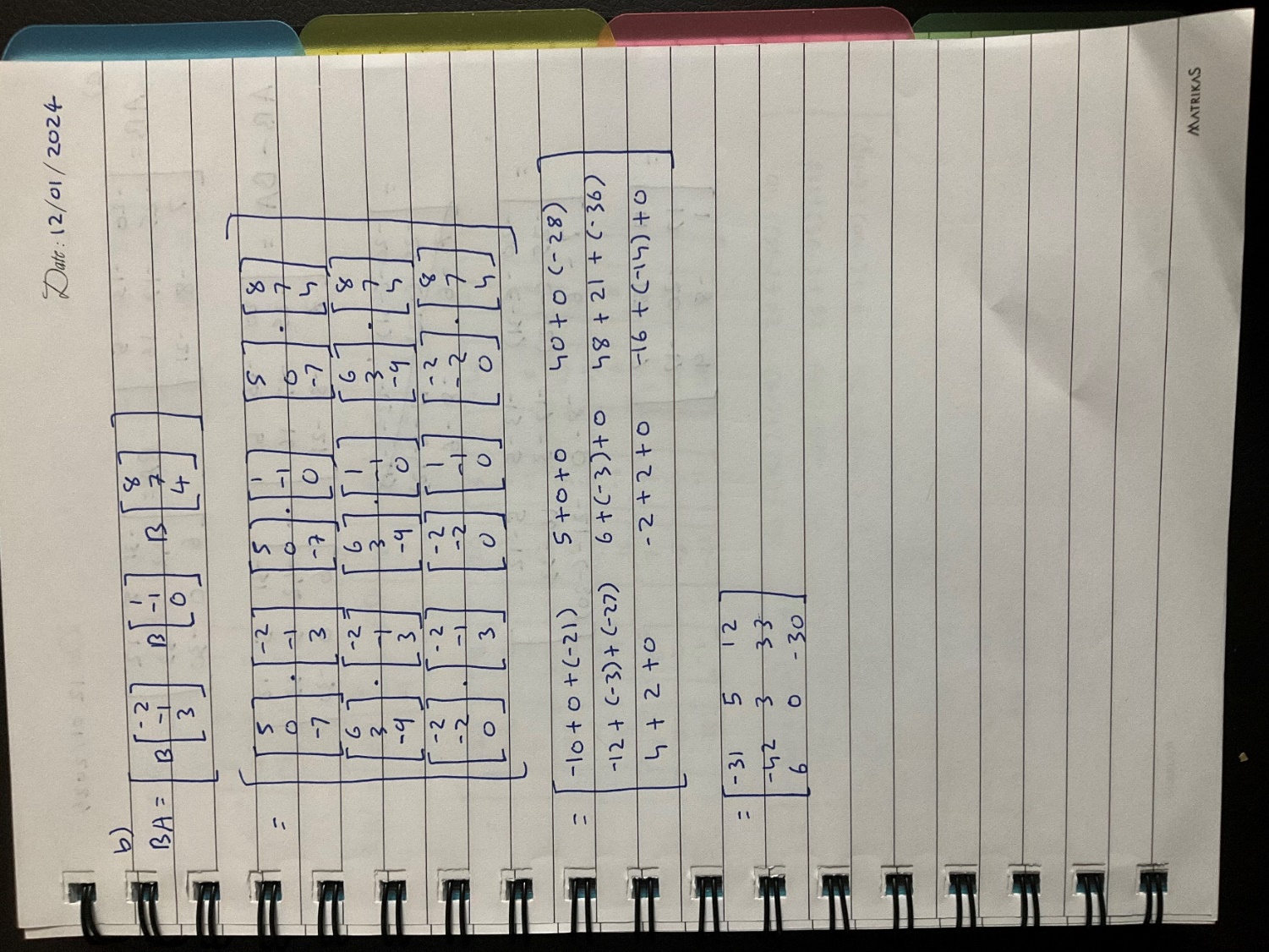
## **Question 3**



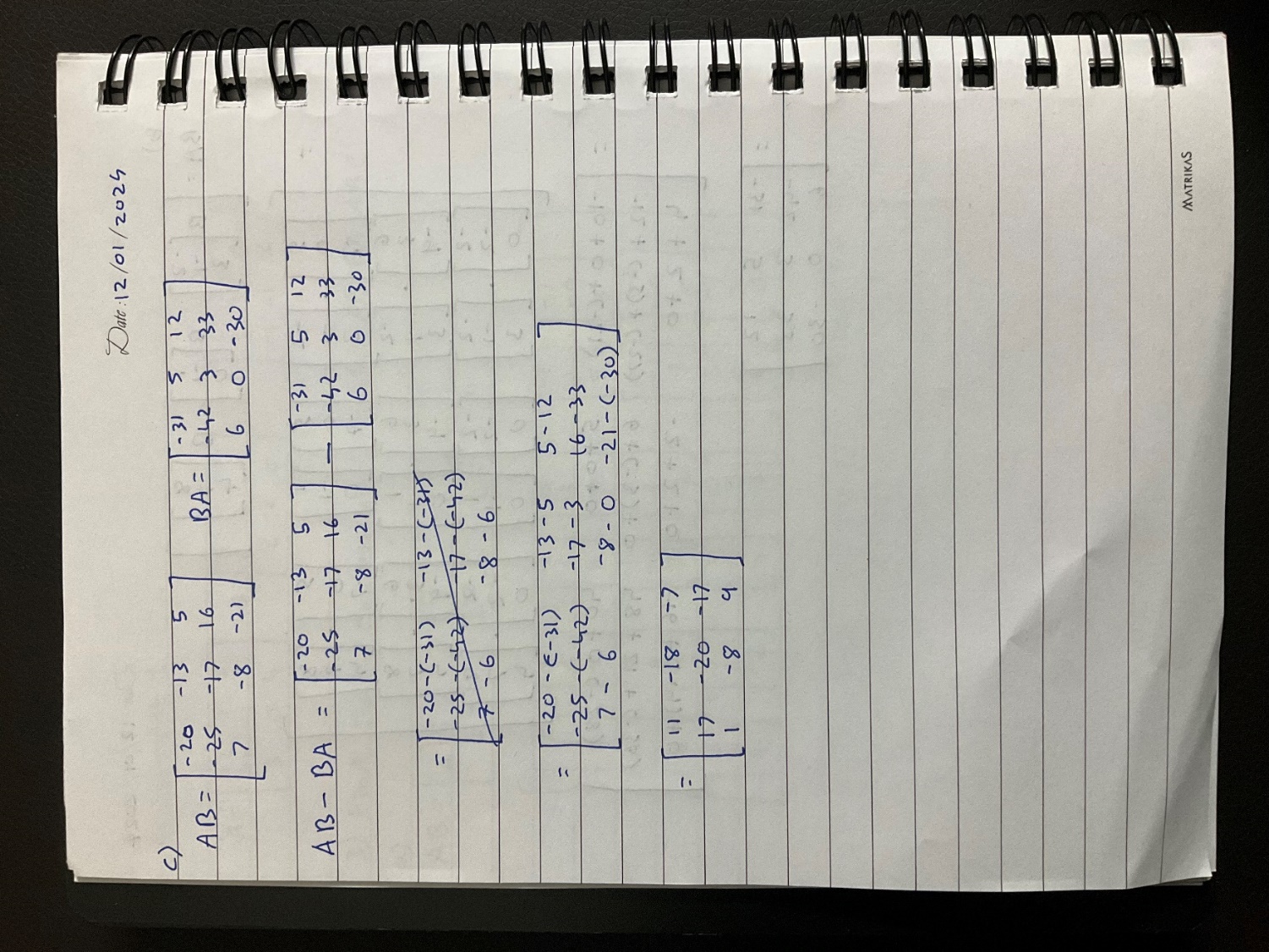
### **(a)**



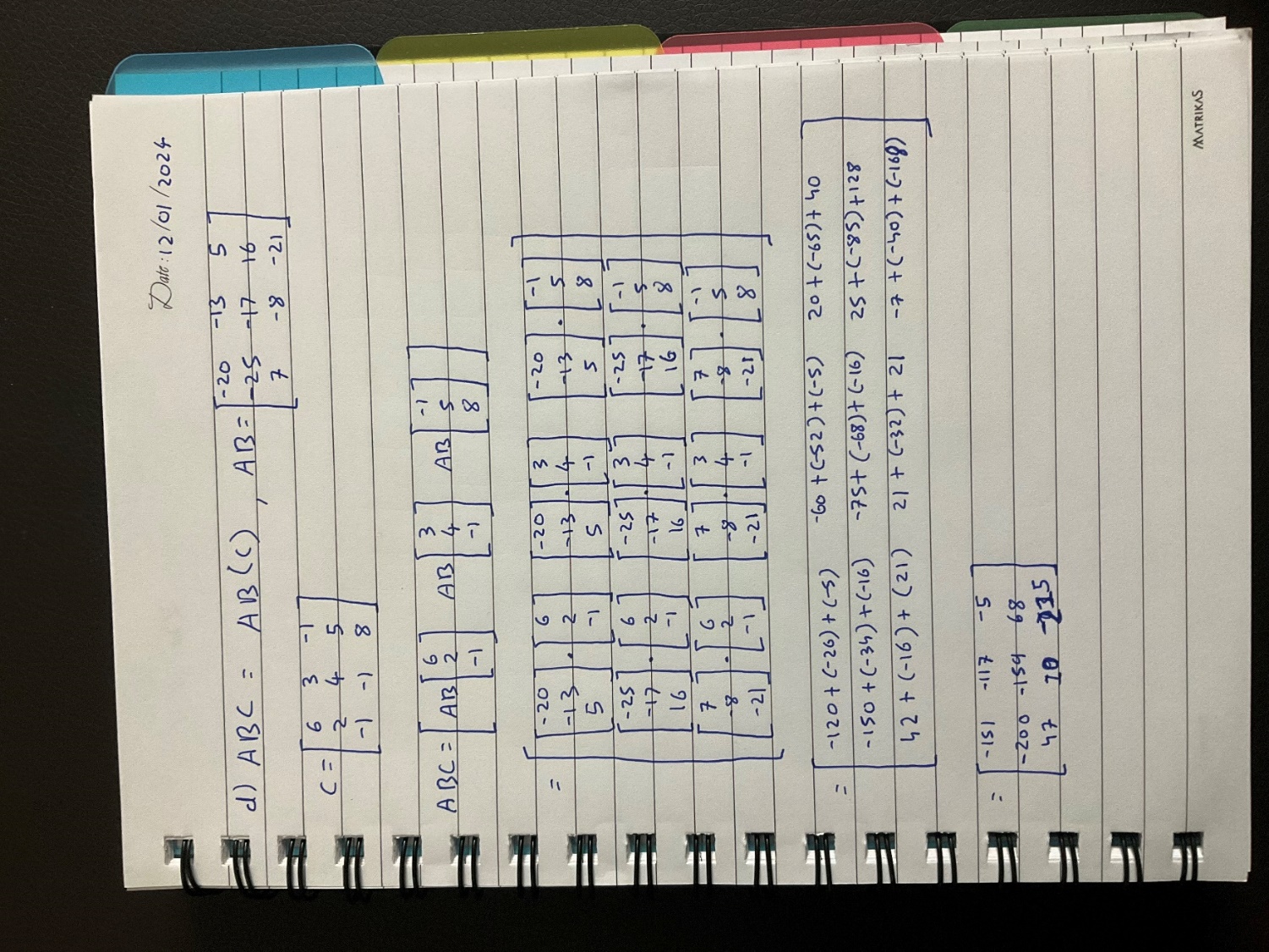
### **(b)**



### **(c)**



### **(d)**



## **Question 4**

## **Question 5**

