Questions: Matrix multiplication

Jessica Taberner

Summary

A selection of questions on the study guide for matrix multiplication.

Before attempting these questions, it is highly recommended that you read Guide: Matrix multiplication.

You are given the following matrices:

$$Q = \begin{bmatrix} 2 & 3 & 1 & 4 \end{bmatrix}, \quad R = \begin{bmatrix} -1 \\ 3 \\ \pi \\ 5 \end{bmatrix}, \quad S = \begin{bmatrix} 1 & -2 & 5 \\ -3 & 4 & -1 \end{bmatrix}, \quad T = \begin{bmatrix} 5 & -6 \\ 7 & 2 \\ 0 & 8 \end{bmatrix},$$

$$U = \begin{bmatrix} -1 & 2 \\ 3 & -4 \end{bmatrix}, \quad V = \begin{bmatrix} \sqrt{2} & -1/2 \\ 3 & 7 \end{bmatrix}, \quad W = \begin{bmatrix} 0 & -1 & 2 & \pi \\ 3 & -4 & 5 & -6 \\ 1 & \sqrt{7} & -8 & 9 \end{bmatrix}, \quad X = \begin{bmatrix} 4 \\ 1/2 \end{bmatrix}.$$

Calculate the following using matrix multiplications. If they are undefined, state that they are undefined and give a reason why. You should give **exact** answers, and not use decimals.

1. QR
2. RQ
3. QS
4. ST
5. S^2
6. TS
7. UV
8. VU
9. WR
10. SW

11. SX

12. TU

13. TV

14. TX

15. UX

16. VX

17. XQ

18. V^2

19. U^2

20. UXQ

21. U^3

22. W^2

23. STV

24. $TXQR$

25. $3UX$

26. $(ST) - 2U$

27. $WR + TX$

28. $-RQR$

29. $(V + U)X$

30. $4U^2 + V^2$

After attempting the questions above, please click this link to find the answers.

Version history

v1.0: initial version created 04/25 by Jessica Taberner as part of a University of St Andrews VIP project.