

Answers: Matrix multiplication

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Summary

Answers to questions for the study guide on matrix multiplication.

These are the answers to [Questions: Matrix multiplication](#).

Please attempt the questions before reading these answers!

Q1

1. $QR = [27 + \pi]$

2. $RQ = \begin{bmatrix} -2 & -3 & -1 & -4 \\ 6 & 9 & 3 & 12 \\ 2\pi & 3\pi & \pi & 4\pi \\ 10 & 15 & 5 & 20 \end{bmatrix}$

3. This is undefined as Q has 4 columns and S has 2 rows.

4. $ST = \begin{bmatrix} -9 & 30 \\ 13 & 18 \end{bmatrix}$

5. S^2 is undefined as S has 3 columns and S has 2 rows.

6. $TS = \begin{bmatrix} 23 & -34 & 31 \\ 1 & -6 & 33 \\ -24 & 32 & -8 \end{bmatrix}$

7. $UV = \begin{bmatrix} 6 - \sqrt{2} & 29/2 \\ -12 + 3\sqrt{2} & -59/2 \end{bmatrix}$

8. $VU = \begin{bmatrix} -3/2 - \sqrt{2} & 2 + 2\sqrt{2} \\ 18 & -22 \end{bmatrix}$

$$9. \quad WR = \begin{bmatrix} -3 + 7\pi \\ -45 + 5\pi \\ 44 + 3\sqrt{7} - 8\pi \end{bmatrix}$$

$$10. \quad SW = \begin{bmatrix} -1 & 7 + 5\sqrt{7} & -48 & 57 + \pi \\ 11 & -13 - \sqrt{7} & 22 & -33 - 3\pi \end{bmatrix}$$

11. SX is undefined as S has 3 columns and X has 2 rows.

$$12. \quad TU = \begin{bmatrix} -23 & 34 \\ -1 & 6 \\ 24 & -32 \end{bmatrix}$$

$$13. \quad TV = \begin{bmatrix} 18 - 5\sqrt{2} & -89/2 \\ 6 + 7\sqrt{2} & 21/2 \\ 24 & 56 \end{bmatrix}$$

$$14. \quad TX = \begin{bmatrix} 17 \\ 29 \\ 4 \end{bmatrix}$$

$$15. \quad UX = \begin{bmatrix} -3 \\ 10 \end{bmatrix}$$

$$16. \quad VX = \begin{bmatrix} -1/4 + 4\sqrt{2} \\ 31/2 \end{bmatrix}$$

$$17. \quad XQ = \begin{bmatrix} -8 & 12 & 4 & 16 \\ 1 & 3/2 & 1/2 & 2 \end{bmatrix}$$

$$18. \quad VV = \begin{bmatrix} 1/2 & -7/2 - \sqrt{2}/2 \\ 21 + 3\sqrt{2} & 95/2 \end{bmatrix}$$

$$19. \quad UU = \begin{bmatrix} 7 & -10 \\ -15 & 22 \end{bmatrix}$$

$$20. \quad UXQ = \begin{bmatrix} -6 & -9 & -3 & -12 \\ 20 & 30 & 10 & 40 \end{bmatrix}$$

$$21. \quad U^3 = \begin{bmatrix} -37 & 54 \\ 81 & -118 \end{bmatrix}$$

22. W^2 is undefined, as W has 4 columns but only 3 rows.

$$23. \quad STU = \begin{bmatrix} 99 & -138 \\ 41 & -46 \end{bmatrix}$$

$$24. \quad TXQR = \begin{bmatrix} 459 + 17\pi \\ 783 + 29\pi \\ 108 + 4\pi \end{bmatrix}$$

$$25. \quad 3UX = \begin{bmatrix} -18 \\ 60 \end{bmatrix}$$

$$26. \quad (ST) - 2U = \begin{bmatrix} -11 & 26 \\ 7 & 10 \end{bmatrix}$$

$$27. \quad WR + TX = \begin{bmatrix} 14 + 7\pi \\ -16 + 5\pi \\ 18 + 3\sqrt{7} - 8\pi \end{bmatrix}$$

$$28. \quad -RQR = \begin{bmatrix} 27 + \pi \\ -81 - 3\pi \\ -27\pi + \pi^2 \\ 135 + 5\pi \end{bmatrix}$$

$$29. \quad (V + U)X = \begin{bmatrix} -5 - 3\sqrt{2} \\ 61 \end{bmatrix}$$

$$30. \quad 4U^2 + V^2 = \begin{bmatrix} 57/2 & -87/2 - \sqrt{2}/2 \\ -39 + 3\sqrt{2} & 271/2 \end{bmatrix}$$

Version history

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

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