

TS Tuition Math - Hwk #4 - Matrices and Vectors**Exercise 1 - Matrices**

In questions 1 to 36, the matrices have the following values:

$$\mathbf{A} = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}; \quad \mathbf{B} = \begin{pmatrix} 0 & 5 \\ 1 & -2 \end{pmatrix}; \quad \mathbf{C} = \begin{pmatrix} 4 & 3 \\ 1 & -2 \end{pmatrix}; \quad \mathbf{D} = \begin{pmatrix} 1 & 5 & 1 \\ 4 & -6 & 1 \end{pmatrix}; \quad \mathbf{E} = \begin{pmatrix} 1 & 0 \\ -1 & 1 \\ 2 & 5 \end{pmatrix};$$

$$\mathbf{F} = (4 \ 5); \quad \mathbf{G} = \begin{pmatrix} 4 \\ 1 \\ 3 \end{pmatrix}; \quad \mathbf{H} = \begin{pmatrix} 0 & 1 & -2 \\ 3 & -4 & 5 \end{pmatrix}; \quad \mathbf{J} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}; \quad \mathbf{K} = \begin{pmatrix} 1 & -3 \\ 0 & 1 \\ -7 & 0 \end{pmatrix}$$

Calculate the resultant value for each question where possible.

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|--|---------------------------------|--|
| 1. $\mathbf{A} + \mathbf{B}$ | 2. $\mathbf{D} + \mathbf{H}$ | 3. $\mathbf{J} + \mathbf{F}$ |
| 4. $\mathbf{B} - \mathbf{C}$ | 5. $2\mathbf{F}$ | 6. $3\mathbf{B}$ |
| 7. $\mathbf{K} - \mathbf{E}$ | 8. $2\mathbf{A} + \mathbf{B}$ | 9. $\mathbf{G} - \mathbf{J}$ |
| 10. $\mathbf{C} + \mathbf{B} + \mathbf{A}$ | 11. $2\mathbf{E} - 3\mathbf{K}$ | 12. $\frac{1}{2}\mathbf{A} - \mathbf{B}$ |
| 13. \mathbf{AB} | 14. \mathbf{BA} | 15. \mathbf{BC} |
| 16. \mathbf{CB} | 17. \mathbf{DG} | 18. \mathbf{AJ} |

Exercise 2 - Vector Arithmetic

Questions 1 to 36 refer to the following vectors.

$$\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} 1 \\ 4 \end{pmatrix} \quad \mathbf{c} = \begin{pmatrix} 4 \\ -3 \end{pmatrix} \quad \mathbf{d} = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$$

$$\mathbf{e} = \begin{pmatrix} 5 \\ 12 \end{pmatrix} \quad \mathbf{f} = \begin{pmatrix} 3 \\ -2 \end{pmatrix} \quad \mathbf{g} = \begin{pmatrix} -4 \\ -2 \end{pmatrix} \quad \mathbf{h} = \begin{pmatrix} -12 \\ 5 \end{pmatrix}$$

Find the following vectors

- | | | |
|--|---|--|
| 13. $\mathbf{b} + \mathbf{h}$ | 14. $\mathbf{f} + \mathbf{g}$ | 15. $\mathbf{e} - \mathbf{b}$ |
| 16. $\mathbf{a} - \mathbf{d}$ | 17. $\mathbf{g} - \mathbf{h}$ | 18. $2\mathbf{a} + 3\mathbf{c}$ |
| 19. $3\mathbf{f} + 2\mathbf{d}$ | 20. $4\mathbf{g} - 2\mathbf{b}$ | 21. $5\mathbf{a} + \frac{1}{2}\mathbf{g}$ |
| 22. $\mathbf{a} + \mathbf{b} + \mathbf{c}$ | 23. $3\mathbf{f} - \mathbf{a} + \mathbf{c}$ | 24. $\mathbf{c} + 2\mathbf{d} + 3\mathbf{e}$ |

