

# Questions: Introduction to vectors

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## Summary

A selection of questions for the study guide on introduction to vectors.

*Before attempting these questions, it is recommended that you read [Guide: Introduction to vectors](#).*

## Q1

Find the magnitude of the following vectors.

1.1.  $\mathbf{a} = -\mathbf{i} + 3\mathbf{j}$

1.2.  $\mathbf{b} = 2\mathbf{i} + 4\mathbf{j} + 6\mathbf{k}$

1.3.  $\mathbf{c} = \mathbf{i} - \mathbf{j} + 4\mathbf{k}$

1.4.  $\mathbf{d} = 5\mathbf{i} - 2\mathbf{j} + \mathbf{k}$

1.5.  $\mathbf{e} = \begin{pmatrix} 2 \\ -1 \\ 4 \end{pmatrix}$

1.6.  $\mathbf{f} = \begin{pmatrix} -3 \\ 6 \\ 2 \end{pmatrix}$

1.7.  $\mathbf{g} = \begin{pmatrix} 5 \\ 1 \\ \sqrt{2} \end{pmatrix}$

1.8.  $\mathbf{h} = 6\mathbf{i} + 2\mathbf{j} + 2\mathbf{k}$

1.9.  $\mathbf{m} = -3\mathbf{i} + 3\mathbf{j} - 3\mathbf{k}$

1.10.  $\mathbf{n} = 2\mathbf{i} + 4\mathbf{j} + 4\mathbf{k}$

1.11.  $\mathbf{p} = 8\mathbf{i} - 2\mathbf{j} + 16\mathbf{k}$

$$1.12. \quad \mathbf{q} = \begin{pmatrix} 5 \\ -2 \\ 14 \end{pmatrix}$$

$$1.13. \quad \mathbf{u} = \begin{pmatrix} 7 \\ 2 \\ -1 \end{pmatrix}$$

$$1.14. \quad \mathbf{v} = \begin{pmatrix} 12 \\ 9 \\ 8 \end{pmatrix}$$

## Q2

Find the unit vectors in the directions of the following vectors.

$$2.1. \quad \mathbf{a} = -2\mathbf{i} + 3\mathbf{j}$$

$$2.2. \quad \mathbf{b} = -2\mathbf{i} + 4\mathbf{j} - 6\mathbf{k}$$

$$2.3. \quad \mathbf{c} = \mathbf{i} + 2\mathbf{j} + 4\mathbf{k}$$

$$2.4. \quad \mathbf{d} = 4\mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$$

$$2.5. \quad \mathbf{e} = \begin{pmatrix} 3 \\ 0 \\ 2 \end{pmatrix}$$

$$2.6. \quad \mathbf{f} = \begin{pmatrix} -3 \\ 1 \\ 7 \end{pmatrix}$$

$$2.7. \quad \mathbf{g} = \begin{pmatrix} -5 \\ 0 \\ \sqrt{2} \end{pmatrix}$$

$$2.8. \quad \mathbf{h} = -3\mathbf{i} + 1\mathbf{j} + 1\mathbf{k}$$

$$2.9. \quad \mathbf{m} = -3\mathbf{i} + 3\mathbf{j} - 3\mathbf{k}$$

$$2.10. \quad \mathbf{n} = 3\mathbf{i} + 6\mathbf{j} + 9\mathbf{k}$$

$$2.11. \quad \mathbf{p} = 3\mathbf{i} - 4\mathbf{j} - 5\mathbf{k}$$

2.12.  $\mathbf{q} = \begin{pmatrix} 4 \\ -3 \\ 12 \end{pmatrix}$

2.13.  $\mathbf{u} = \begin{pmatrix} 6 \\ 5 \\ 4 \end{pmatrix}$

2.14.  $\mathbf{v} = \begin{pmatrix} 2 \\ 4 \\ 8 \end{pmatrix}$

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[After attempting the questions above, please click this link to find the answers.](#)

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## Version history and licensing

v1.0: initial version created 08/23 by Zheng Chen as part of a University of St Andrews STEP project.

- v1.1: edited 05/24 by tdhc.

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