Introduction to vectors: questions

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Summary

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

Before attempting these questions, it is highly recommended that you read Guide: Introduction to vectors.

Q1

Are these vectors parallel?

1.1. $\overrightarrow{AB} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ and $\overrightarrow{CD} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

1.2. $\overrightarrow{EF} = \begin{pmatrix} 2x \\ -y \end{pmatrix}$ and $\overrightarrow{MN} = \begin{pmatrix} 6x \\ -3y \end{pmatrix}$

1.3. $\overrightarrow{PQ} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ and $\overrightarrow{BC} = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$

1.4. $\overrightarrow{DE} = \begin{pmatrix} 4 \\ 2 \\ 0 \end{pmatrix}$ and $\overrightarrow{BC} = \begin{pmatrix} 8 \\ -4 \\ 0 \end{pmatrix}$

1.5. $\overrightarrow{MO} = \begin{pmatrix} 6 \\ 8 \\ 10 \end{pmatrix}$ and $\overrightarrow{AC} = \begin{pmatrix} -3 \\ -4 \\ -5 \end{pmatrix}$

Q2

Find the magnitude of the following vectors

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q3

Find the unit vectors for the following vectors

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Please click this link to find the answers.
