

Worksheet: Basics of Vectors

This worksheet has questions on the basics of vectors. Before attempting the questions below you could read the study guide: [Basics of Vectors](#).

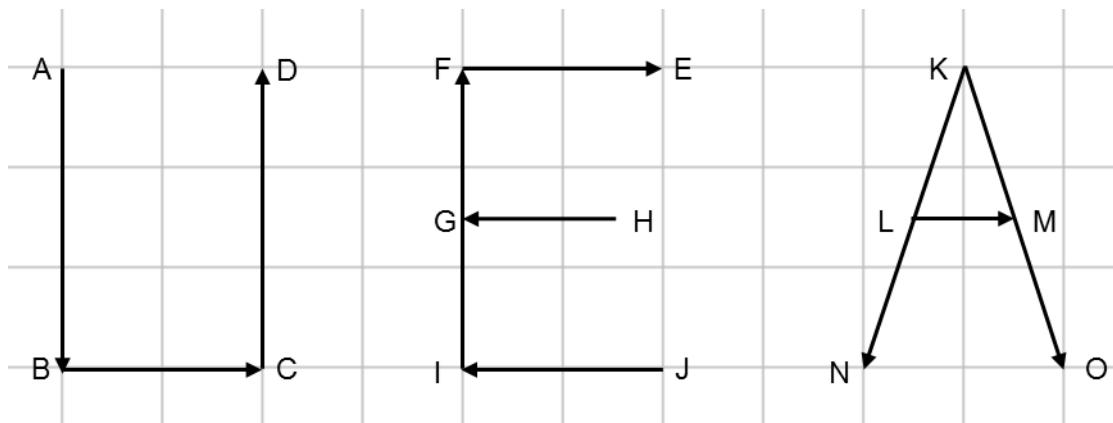
Basics of Vectors
study guide



Model Answers
to this sheet



1. Look at the vectors in the picture below:



Which vectors have:

- the same direction?
- the same magnitude?
- opposite direction?
- same direction and different magnitude?
- different direction and same magnitude?
- same direction and same magnitude?
- opposite direction and same magnitude?

Does it matter that you don't know the scale of the grid or the coordinates of the points?

2. What is the magnitude of the vectors:

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

ii. $\mathbf{b} = 1\mathbf{i} - 4\mathbf{j}$

iii. $\mathbf{c} = -2\mathbf{i} + \mathbf{j}$

iv. $\mathbf{d} = -3\mathbf{i} - 5\mathbf{j}$

3. Use graph paper to draw the 2-dimensional vectors that describe how to get from the origin to the points:

i. $(2, 1)$

v. $(10, 10)$

ii. $(-1, -1)$

vi. $(-5, 4)$

iii. $(-4, -5)$

vii. $(3, 3)$

iv. $(-4, -4)$

viii. $(-1, 2)$

- Which of the vectors that you drew have the same direction?
- Which of the vectors that you drew have the opposite direction?
- Which of the vectors that you drew have the same magnitude?

4. What are the magnitudes and the corresponding unit vectors of the vectors:

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

ii. $\mathbf{b} = 3\mathbf{i} + \mathbf{j} - 4\mathbf{k}$

iii. $\mathbf{c} = \frac{1}{2}\mathbf{i} - \mathbf{j} + 0\mathbf{k}$

iv. $\mathbf{d} = \sqrt{2}\mathbf{i} - \frac{2}{3}\mathbf{j} + \frac{1}{3}\mathbf{k}$

v. $\mathbf{e} = \frac{3}{2}\mathbf{i} - \mathbf{j} + \frac{\sqrt{11}}{2}\mathbf{k}$



This worksheet is one of a series on mathematics produced by the Learning Enhancement Team with funding from the UEA Alumni Fund. Scan the QR-code with a smartphone app for [more resources](#).



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