Guide to: Vectors

maths Links

Explanation:

A column vector writes horizontal movement on top (+ right, − left) and vertical movement on the bottom (+ up, − down). In geometric vector diagrams, going against an arrow reverses the sign (**BA = −AB**), and to travel from A to B via O you add the vectors: **AB = AO + OB = −a + b = b − a**.

Two vectors are **parallel** if one is a scalar multiple of the other (for example, **2a + 4b = 2(a + 2b)** is parallel to **a + 2b**).

Example 1: Given column vectors **a = (4, −1)** and **b = (−2, 5)**, work out **3a − 2b**.

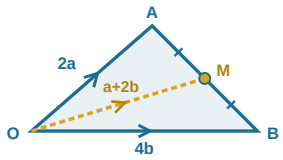
Solution:

Multiply each component: **3a = (12, −3)** and **2b = (−4, 10)**
Top component: 12 − (−4) = **16**
Bottom component: −3 − 10 = **−13**
Answer: (16, −13) as a column vector

Example 2: In △OAB, **OA = 2a** and **OB = 4b**. **M** is the midpoint of AB. Find **OM** in terms of **a** and **b**.

Solution:

AB = AO + OB = **−2a + 4b**
AM = $\frac{1}{2}$AB = **−a + 2b**
OM = 2a + (−a + 2b)
Answer: a + 2b



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