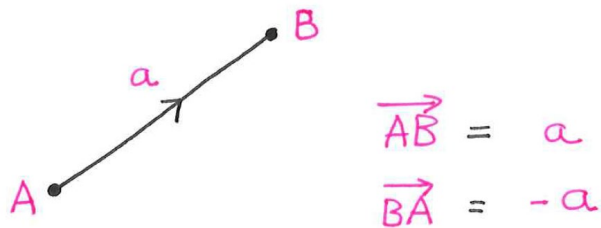
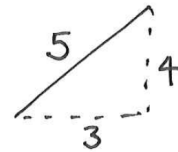


Year 1 Pure Chapter 11 - Vectors

Labels



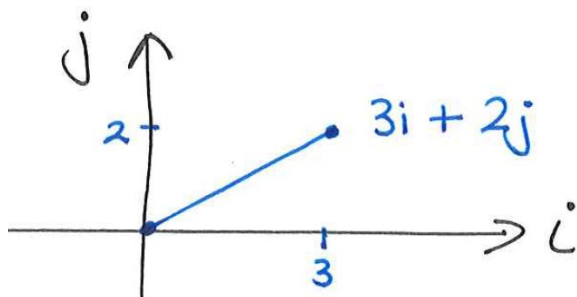
Magnitude and Length



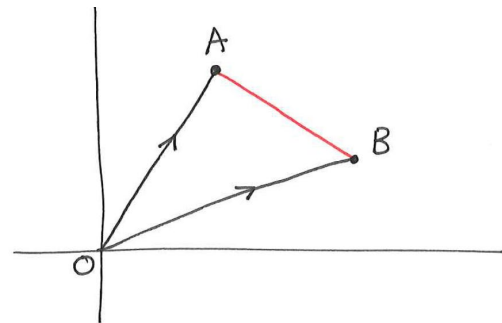
$$a = 3i + 4j$$

$$|a| = \sqrt{3^2 + 4^2} = 5$$

$i + j$ Components



Position Vectors



$$\vec{AB} = \vec{AO} + \vec{OB}$$

NOTE $\vec{AO} = -\vec{OA}$

Parallel

Show they have the same gradient.

$$2i + 4j \quad \text{gradient} = \frac{4}{2} = 2$$

$$6i + 12j \quad \text{gradient} = \frac{12}{6} = 2$$

gradients are the same $\therefore$ parallel

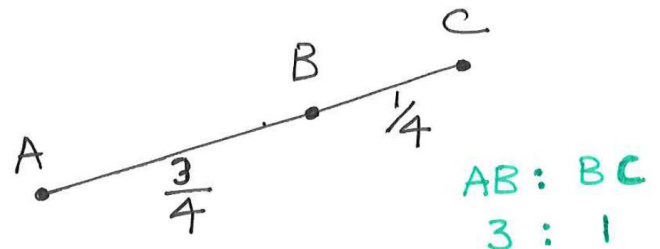
or

Show that one is a multiple of the other.

$$2i + 4j = 2(a + 2b)$$

$$6i + 12j = 3(a + 2b)$$

Ratios



Velocity and Journeys

$$\text{Current Position} = \text{Velocity} \times \text{time} + \text{starting Position}$$

$$\text{Velocity} = 3\mathbf{i} + 2\mathbf{j}$$

$$\text{Time} = 5$$

$$\text{Current Position} = 5\mathbf{i} + 5\mathbf{j}$$

Find the starting position.

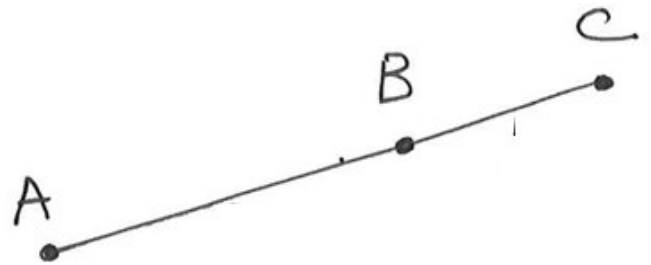
$$5\mathbf{i} + 9\mathbf{j} = 5(3\mathbf{i} + 2\mathbf{j}) + \text{Starting}$$

$$5\mathbf{i} + 9\mathbf{j} = 15\mathbf{i} + 10\mathbf{j} + \text{Starting}$$

$$\text{Starting} = -10\mathbf{i} - \mathbf{j}$$

Collinear

Collinear means lying in the same straight line.



To prove that three points are collinear you can show that AC is a multiple of AB.

$$\mathbf{AC} = \lambda \mathbf{AB}$$

λ is a multiple to be found.