

TG 1 Let $\vec{a} = 2\vec{i} - \vec{j}$, $\vec{b} = 4\vec{i} - 3\vec{j}$ and $\vec{c} = -2\vec{i} - \vec{j}$.

(a) Calculate $\vec{a} \cdot \vec{b}$ and $\vec{a} \cdot \vec{c}$.

(b) Verify that $\vec{a} \cdot (\vec{b} + \vec{c}) = \vec{a} \cdot \vec{b} + \vec{a} \cdot \vec{c}$.

$$(a) \vec{a} \cdot \vec{b} = 2 \times 4 + (-1)(-3)$$

$$= 11$$

$$\vec{a} \cdot \vec{c} = 2 \times (-2) + (-1)(-1)$$

$$= -3$$

$$(b) \vec{b} + \vec{c} = (4 - 2)\vec{i} + (-3 - 1)\vec{j}$$

$$= 2\vec{i} - 4\vec{j}$$

$$\text{LHS} = \vec{a} \cdot (\vec{b} + \vec{c})$$

$$= 2 \times 2 + (-1)(-4)$$

$$= 8$$

$$\text{RHS} = \vec{a} \cdot \vec{b} + \vec{a} \cdot \vec{c}$$

$$= 11 - 3 \text{ (from (a))}$$

$$= 8$$

$$\therefore \text{LHS} = \text{RHS}$$

* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.

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