

12. Vectors \mathbf{OM} , \mathbf{ON} and \mathbf{OP} are shown in the diagram below.

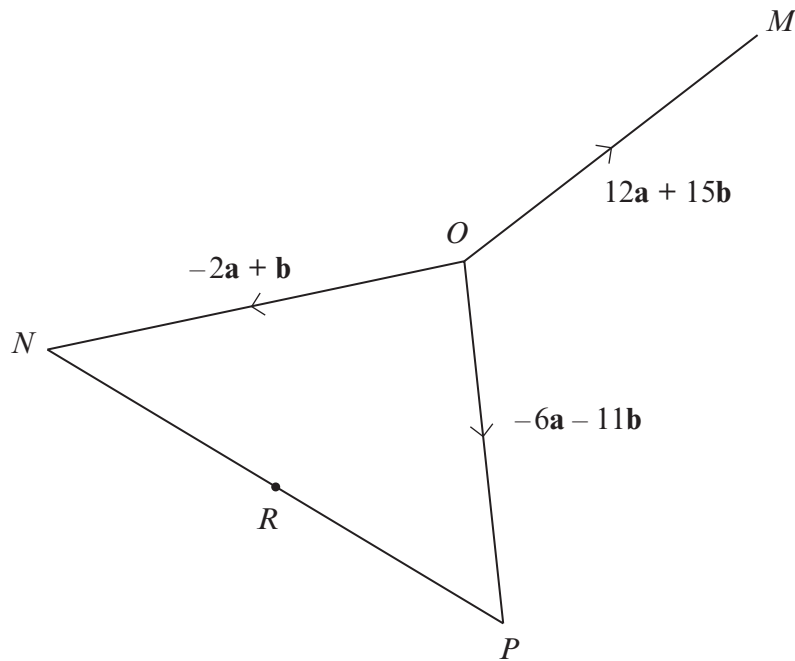


Diagram not drawn to scale

(a) Find \mathbf{PN} in terms of \mathbf{a} and \mathbf{b} .

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[2]

(b) The point R is the mid-point of NP .

(i) Find \mathbf{RO} in terms of \mathbf{a} and \mathbf{b} in its simplest form.

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(ii) Show that $\mathbf{OM} = k\mathbf{RO}$ where k is a constant.

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(iii) State **two** geometrical relationships between *RO* and *OM*.

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[5]