23. Vectors **OM**, **ON** and **LN** are shown in the diagram below.

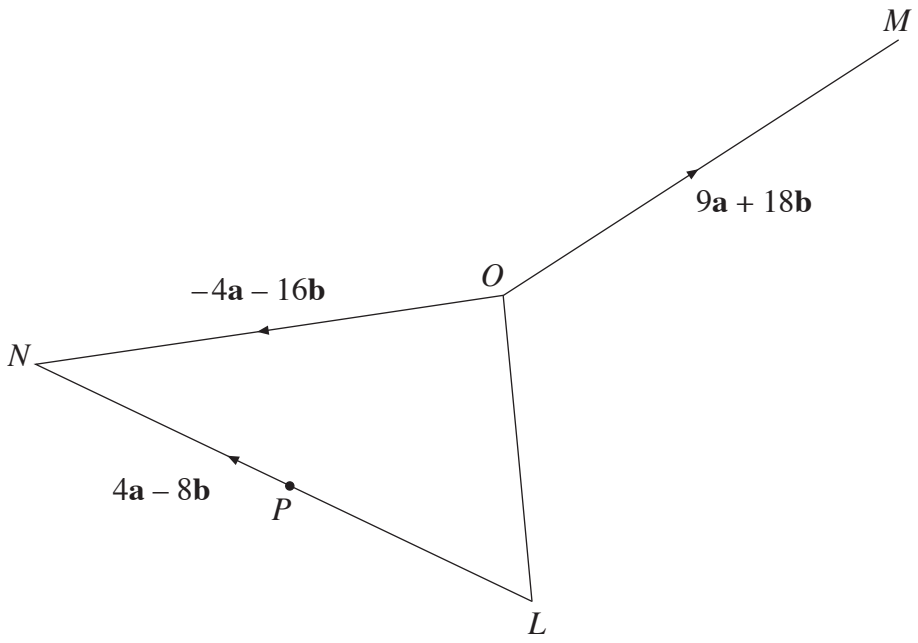

Diagram not drawn to scale.

Given that **OM** = 9**a** + 18**b**, **ON** = −4**a** − 16**b** and **LN** = 4**a** − 8**b** and point *P* is the mid-point of *LN*,

(a) find **PO** in terms of **a** and **b** in its simplest form.

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[2]

(b) Show that **PO** = *k***OM** where *k* is a constant.

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[1]

(c) State **two** geometrical relationships between *PO* and *OM*.

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[2]