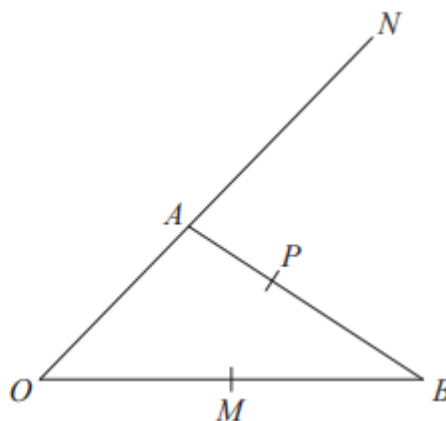


21



OAN , OMB and APB are straight lines.

$AN = 2OA$.

M is the midpoint of OB .

$\vec{OA} = \mathbf{a}$ $\vec{OB} = \mathbf{b}$

$\vec{AP} = k\vec{AB}$ where k is a scalar quantity.

Given that MPN is a straight line, find the value of k .

$$\vec{MN} = \vec{MO} + \vec{ON} = -\frac{1}{2}\mathbf{b} + 3\mathbf{a}$$

$$\vec{PN} = \vec{PA} + \vec{AN} = k\vec{BA} + \vec{AN} = k(-\mathbf{b} + \mathbf{a}) + 2\mathbf{a} = (k + 2)\mathbf{a} - k\mathbf{b}$$

$$\frac{k+2}{3} = \frac{k}{\left(\frac{1}{2}\right)} \Rightarrow \frac{k+2}{3} = 2k \Rightarrow k + 2 = 6k \Rightarrow k = \frac{2}{5}$$