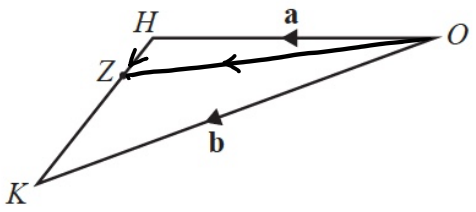
Problem 0580/42/F/M/23 Q4b



NOT TO SCALE

The diagram shows triangle OHK, where O is the origin.
The position vector of H is $\mathbf{a}$ and the position vector of K is $\mathbf{b}$.
Z is the point on HK such that $HZ : ZK = 2 : 5$.

Find the position vector of Z, in terms of $\mathbf{a}$ and $\mathbf{b}$.
Give your answer in its simplest form.

Sol

$\overrightarrow{HK} = \overrightarrow{OK} - \overrightarrow{OH}$

$\overrightarrow{HK} = b - a$

$\triangle OHZ$

$HZ = \frac{2}{7}(b-a)$

$\overrightarrow{OZ} = \overrightarrow{HZ} + \overrightarrow{OH}$

$= \frac{2}{7}b - \frac{2}{7}a + a$

$= \frac{2}{7}b + \frac{5}{7}a$

..... [3]