Given that $\langle y_n \rangle$ is Bounded Sequence and $\langle x_n \rangle$ be a sequence of R s.t.

$$\lim_{n\to\infty} x_n \to 0$$

$\because$ $\langle y_n \rangle$ bounded then

$$m \leq y_n \leq M \quad \forall \quad n \in N$$

Can be written as.

$$m \cdot x_n \leq y_n \cdot x_n \leq M \cdot x_n$$

$$\lim_{n\to\infty} m \cdot x_n \leq \lim_{n\to\infty} y_n \cdot x_n \leq \lim_{n\to\infty} M \cdot x_n \quad \text{--- } (1)$$

using ~~of~~ sandwich theorem. $c_n \leq a_n \leq b_n$

if $\lim_{n\to\infty} c_n = l$

and $\lim_{n\to\infty} b_n = l$

then $\lim_{n\to\infty} a_n = l$

and If a sequence is convergent

and $\lim_{n\to\infty} x_n = l$

$\Rightarrow$ $\lim_{n\to\infty} a\, x_n = a \cdot l$

Hence by (1)

$0 \leq \lim_{n\to\infty} y_n \cdot x_n \leq 0$

$\Rightarrow$ $\boxed{\lim_{n\to\infty} y_n \cdot x_n = 0}$