Answer on Question #64524 – Math – Real Analysis

Question

Show that if X and Y are sequences such that X converges to x≠ 0 and XY converges, then Y converges.

Solution

Since X converges to $x \neq 0$ there exists K such that for all $n > K$: $x_n \neq 0$.
Let $lim\, XY = z$.
X converges to x for all n greater than a certain number and XY converges to z for all n greater than some number.
Since $Y = \frac{XY}{X}$ $if\ X \neq 0$, by properties of limits, Y converges to $\frac{z}{x}$.
Hence Y converges.