

HW 2-3 continued

② Show $|[0,1]| = |[0,2]|$.

③ Show $|(0,1)| = |(0,\infty)|$.

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① Prove that the sequence $(\frac{1}{2^k})_k$ converges.

② Suppose a sequence (y_n) of integers converges. Prove that $\exists p \in \mathbb{N}$ s.t. $y_n = y_m$ when $n, m \geq p$.

③ For the sake of this homework, let us say that a sequence (x_n) "zooms" on $x \in \mathbb{R}$ to mean:

$$\exists k \in \mathbb{N} \text{ s.t. } \forall \varepsilon > 0 \quad |x_n - x| < \varepsilon \text{ when } n \geq k.$$

How does "zooming on" relate to "converges to"?

Does one imply the other? Are the two equivalent?

Explain in simpler terms what it means that (x_n) zooms on x .