check grade dist

MA 426 2nd Ed

pop tests not graded just for checking

HW not graded should do anyway

$x, y \in \mathbb{R}$ distance between $x, y = |x-y| = d(x,y)$

Ch 2 Set M d = distance or metric on M

$d : M \times M \to [0, \infty)$

3 properties of a metric

① $d(x,y) \geq 0 \ \forall \ x, y \in M$ and $d(x,y) = 0 \iff x = y$

positive definite

② $d(x,y) = d(y,x)$

Symmetric

③ $d(x,y) \leq d(x,z) + d(z,y)$

Triangle inequality

Ex:

$M \subset \mathbb{R}$ $\quad$ $d(x,y) = |x-y|$

$x_n \in M$ $\quad$ $(x_n)_1^\infty$ $\quad$ $x \in M$

$x_n \to x$

We say $x_n \to x$ if $\forall \varepsilon > 0 \ \exists \ k(\varepsilon) > 0 \ni d(x_n, x) < \varepsilon$ if $n > k(\varepsilon)$

$x_n = \frac{n}{n+1}$ for $n \in \mathbb{N}$

$x_n \to 1$

Let $\varepsilon > 0$ then wts $\exists K(\varepsilon) > 0 \ni d(x_n, x) < \varepsilon$ is $n > K(\varepsilon)$

$d(x_n, x) = d(x_n, 1) = \left| \frac{n}{n+1} - 1 \right| = \left| \frac{-1}{n+1} \right| = \frac{1}{n+1} < \varepsilon$

$n > \frac{1}{\varepsilon} - 1$

Let $K(\varepsilon) = \frac{1}{\varepsilon} - 1$ or $\frac{1}{\varepsilon}$ reasonable ε