Quiz 4 MA 107 (Max. Marks 10)
IIT Bombay, 16th April 2019

(1) Given $a, b \in \mathbb{Z} \setminus \{0\}$, prove that $\gcd(a, b-a) = gcd(a, b)$.

(2) Show that every Cauchy sequence of real numbers is bounded.

(3) Find the limit of the sequence given by $a_n = \dfrac{n!}{n^n}$ for $n \in \mathbb{N}$. Justify your answer.

(4) Show that the following is an equivalence relation on A :
$A = \mathbb{R}^2$ and for $a, b \in A$, a is related to b if a has the same y-coordinate as b.
Identify (with proof) the equivalence class of $(0, 1)$.