Answer on Question #76364 – Math – Discrete Mathematics

Question

Define the relation R as
R = {(a, b)|a, b ∈ Z, 4 divides a − b}. Show that R is reflexive, transitive and symmetric.

Solution

1. Reflexive property: $a - a = 0 \vdots 4$ for every $a \in \mathrm{Z}$.
2. Transitive property: another definition for this relation is $R = \{(a, b)|a, b \in \mathrm{Z}, a \equiv b(mod\ 4)\}$. As congruence relation is transitive R is transitive.
3. Symmetric property: if 4 divides a – b, then 4 divides b – a, so R is symmetric.