Proof: Let a three sets $A = \{4n + 1\}_{n=1}^{\infty}$, $B = \{4n + 3\}_{n=1}^{\infty}$ and $C = A \cup B$. Since sets A and B do not intersect we can sum they to do their union:

$$4n + 1 + 4n + 3 = 8n + 4$$

Divive by 4.
$$2n + 1$$

By $2n+1$ we can present any odd number, then a parts of which is consist in the union can present any odd number too, Q.E.D.