Task
Prove that for any integer n, at least one of the integers $n, n+2, n+4$ is divisible by 3.

Solution
Task is equavalent to proving the following theorem:

Theorem. $\forall n \in \mathbb{N} : 3 \mid n \vee 3 \mid (n+2) \vee 3 \mid (n+4)$

Proof. By cases.
By division theorem, all integers can be expressed in one of these forms: $3k, 3k+1, 3k+2$, for some $k \in \mathbb{Z}$.
In case $n = 3k$, for some k, it is divisible by 3 (by definition of divisibility).
In case $n = 3k+1$, for some k, then $n+2 = 3k+3 = 3(k+1)$ is divisible by 3 (by definition of divisibility).
In case $n = 3k+2$, for some k, then $n+4 = 3k+6 = 3(k+2)$ is divisible by 3 (by definition of divisibility).
Hence, we proved that for any integer n, at least one of the integers $n, n+2, n+4$ is divisible by 3. $\square$