Introduction to Mathematical Thinking

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Question 5

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

Answer

1. Keeping in mind that every third integer is divisible by 3,

for any integer n, either n, $n+1$, or $n+2$ must be divisible by 3.

2. If n or $n+2$ is divisible by 3, the given statement is *TRUE*

3. If not, $n+1$ must be divisible by 3, so $(n+1)+3 = n+4$ must also be divisible by 3.

$\therefore$ for any integer n, at least one of the integers n, $n+2$, $n+4$ is divisible by 3, and the given statement is *TRUE*.