Test Flight Question 5

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28 June 2018

Theorem. *For any integer n, at least one of the integers n, $n+2$, $n+4$ is divisible by 3.*

Proof. Any integer n can be expressed as one of $3k$, $3k+1$, or $3k+2$, where k is another integer. Let us examine all three cases.

1. If n can be expressed as $3k$, then n is divisible by 3.
2. If n can be expressed as $3k+1$, then $n+2 = (3k+1)+2 = 3k+3$ which is divisible by 3.
3. If n can be expressed as $3k+2$, then $n+4 = (3k+2)+4 = 3k+6$ which is divisible by 3.

Thus the theorem is proved for any integer n. □