

Question #25992 Prove that the sum of any 7 consecutive non-negative integers is divisible by 7. Is this true for any positive integers instead of 7.

Solution Take any positive integer n , let be k such that $n = k \pmod{7}$, then $n + i = k + i \pmod{7}$, thus the sum of any consecutive integers is $\sum_{i=0}^6 n + i = 7k + 6(6 + 1)/2 = 0 \pmod{7}$. This is not true for all integers, really $3 + 4 = 1 \pmod{2}$, thus the sum of 2 consecutive integers is not divisible by 7.