Thus it suffices to show that $x_1 + bx_2 \equiv x_1 + (n + 1) x_2 \not\equiv 0 \pmod{n^2 + 2n}$ for all $|x_i| \leqq n - 1$ except $x_1 = x_2 = 0$. But this follows immediately from the fact that

$$2 \leqq |x_1 + (n + 1) x_2| \leqq n^2 + n - 2 .$$

It would still be quite interesting to know if Theorem 1 can be improved for $n \geqq 3$.

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