1. Use congruence to show that for every $n \in \mathbb{N}$, $10(3n+8)(7n+27)$ is divisible by 4.

2. Find the remainder of 17^{1405} when divided by 6.

3. Find all integer solutions (x, y) to the equation

$$30x + 20y = 350$$

such that $x > 0$ and $y > 0$.

4. Find all integers $x \in \mathbb{Z}$ such that

$$666x \equiv 180 \pmod{306}$$