

Use induction to solve the following problems.

Problem 1. Show that for any positive integer n ,

$$1 + 2 + \dots + n = \frac{n(n+1)}{2}.$$

Problem 2. Show that for every natural number n ,

$$2^n > n.$$

Problem 3. A bank has an unlimited number of 3-peso and 5-peso notes. Show that it can pay any number of pesos greater than 7.

Problem 4. Let n be a positive integer, and let

$$m = 11111 \dots 111111$$

where there are 3^n ones. Show that m is divisible by 3^n .

Problem 5. Show that for every natural number n , $11^{n+2} + 12^{2n+1}$ is divisible by 133.