Problem Set 1-2

There are 3 digits less than 3. Thus, the probability of getting one of these digits is 3 out of 10. The ten decimal places are independent and may be filled by any of the ten digits 0 to 9. Treat the ten decimal places as steps in a random walk, and let $p (= 0.3)$ be the probability of getting a desired digit in any decimal place. Use the Binomial distribution $W_N(n)$ with $N = 10$ and $n = 3$ to find the probability.

$$W_{10}(3) = \frac{10!}{3!7!} \left( \frac{3}{10} \right)^3 \left( \frac{7}{10} \right)^7 = \frac{10 \cdot 9 \cdot 8 \cdot (27) \cdot 7^7}{3 \cdot 2 \cdot 10^{10}} = 0.267$$