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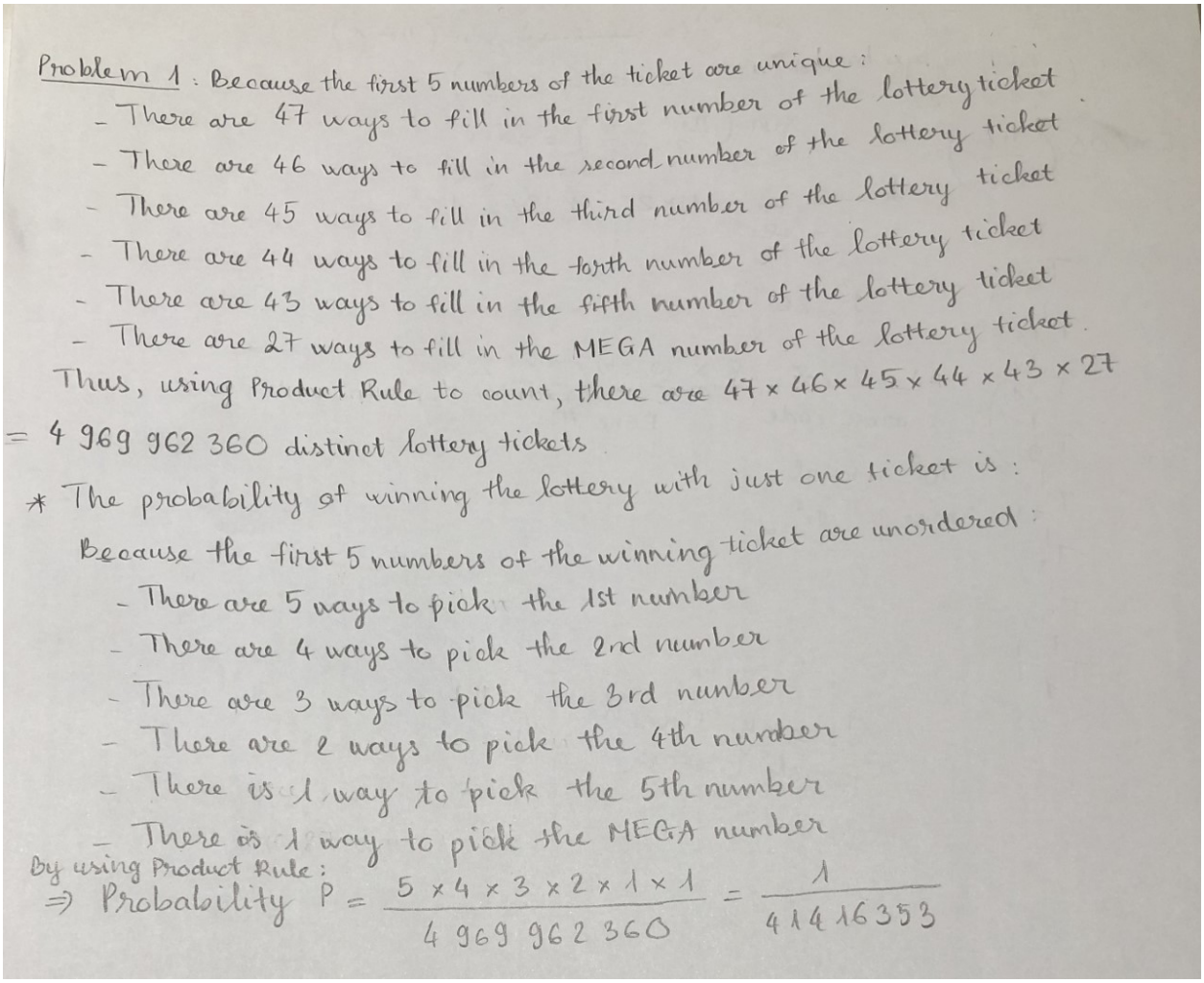
Problem 1



Problem 1 : Because the first 5 numbers of the ticket are unique :
- There are 47 ways to fill in the first number of the lottery ticket
- There are 46 ways to fill in the second number of the lottery ticket
- There are 45 ways to fill in the third number of the lottery ticket
- There are 44 ways to fill in the forth number of the lottery ticket
- There are 43 ways to fill in the fifth number of the lottery ticket
- There are 27 ways to fill in the MEGA number of the lottery ticket.

Thus, using Product Rule to count, there are $47 \times 46 \times 45 \times 44 \times 43 \times 27$ = 4 969 962 360 distinct lottery tickets

* The probability of winning the lottery with just one ticket is :

Because the first 5 numbers of the winning ticket are unordered :
- There are 5 ways to pick the 1st number
- There are 4 ways to pick the 2nd number
- There are 3 ways to pick the 3rd number
- There are 2 ways to pick the 4th number
- There is 1 way to pick the 5th number
- There is 1 way to pick the MEGA number

By using Product Rule :

$$\Rightarrow \text{Probability } P = \frac{5 \times 4 \times 3 \times 2 \times 1 \times 1}{4\,969\,962\,360} = \frac{1}{41416353}$$