QUESTION 2. Find the number of possible choices for a 2-digit password that is greater than 19. Then find the number of possible choices for a 4-digit Personal Identification Number (PIN) if the digits cannot be repeated.

Solution

1) The number of possible choices for a 2-digit password that is greater than 19:

$$(A_{10}^2 + 10) - 20 = (\frac{10!}{(10-2)!} + 10) - 20 = (\frac{10!}{8!} + 10) - 20 = (9*10 + 10) - 20 = 80.$$

A_{10}^2 - permutations without repetitions;

10 – number of 00,11,22,33,44,55,66,77,88,99;

20 – number of 2-digit password that smaller than 19;

Answer: The number of possible choices for a 2-digit password that is greater than 19 are 80.

2) The number of possible choices for a 4-digit Personal Identification Number (PIN) if the digits cannot be repeated:

$$A_{10}^4 = \frac{10!}{(10-4)!} = \frac{10!}{6!} = 7*8*9*10 = 5040;$$

Answer: The number of possible choices for a 4-digit Personal Identification Number (PIN) if the digits cannot be repeated are 5040.