$\{0, 1, 2, 3, \ldots, 9\}$ PIN_1

$\{00, 01, 02, \ldots, 99\}$ PIN_2

$\{000, 001, 002, \ldots, 999)$ PIN_3

$\{0001, 0002, \ldots, 9999)$ PIN_4

$$N(PIN_1) = P(10, 1) = 10 = 10$$

$$N(PIN_2) = P(10, 2) = 10 \cdot 9 = 90$$

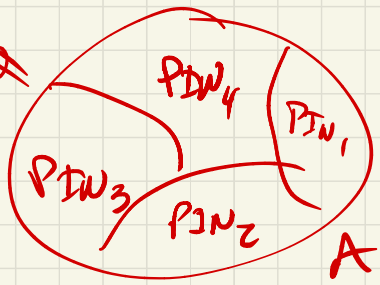
$$= P(10, 3) = 10 \cdot 9 \cdot 8 = 720$$

$$= P(10, 4) = 10 \cdot 9 \cdot 8 \cdot 7 = 5040$$

$$n(A) \quad \boxed{N(PIN_{[1-4]})} = \sum_{i=1}^{4} PIN_i = \underline{5860}$$

Mutually disjoint

$PIN_1 \cap PIN_2 = \emptyset$



Addition Rule

100 . . . 999 are divisible by 5

Ends in 5 or a 0

[1-9] [0-9] 0   [1-9] [0-9] 5

10 · 9 · 1   10 · 9 · 1

90 + 90

180

$\boxed{0-9}$ – 2

000 – 999   10 – 99 – 18

$\boxed{100 - 999}$ 180

Ending   Ending

9 · 1   9 · 1

9 · 9

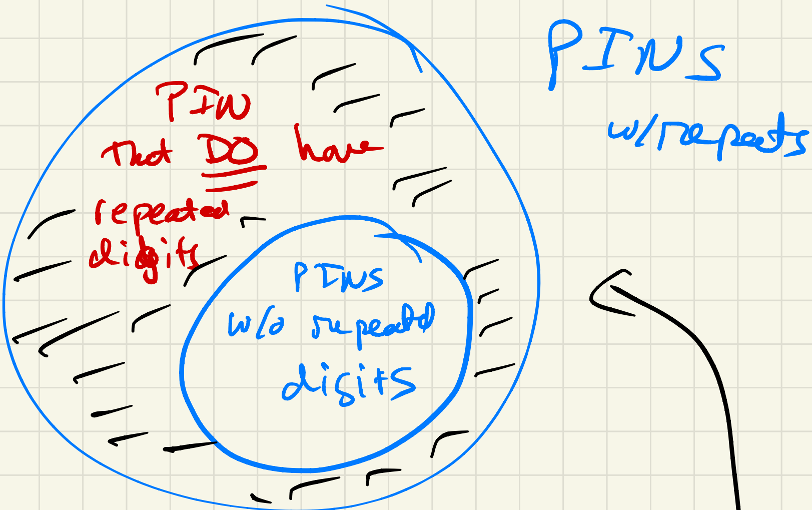
$\boxed{200}$

[0-9] [0-9] [0-9] [0-9]

$10 \cdot 10 \cdot 10 \cdot 10 = 10^4$

$= 1000$

$P(10,4) = 10 \cdot 9 \cdot 8 \cdot 7 = 5040$



$N(\text{PINS}) - N(\text{PINs w/o repeats})$

$= \boxed{N(\text{PIN w/ repeats})}$

$\boxed{4060!}$

What is the number of pins w/o <u>any</u> 5's

$\underset{[0,1,2,3,4,6,7,8,9]}{\underline{9}}$ $\underline{9}$ $\underline{9}$ $\underline{9}$ $= 9^4$

Total number is 10^4

$10^4 - 9^4$ is the number of pins with at least one 5.

$$\frac{10^4 - 9^4}{10^4} = \underset{100\%}{1} - \boxed{\frac{9^4}{10^4}}$$

probability of drawing a number w/o any 5's