Gabe

1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
1 2 3 4 5 6 7 8 9

10 - 1 = 9

Adding 9 is
taking 1 off but
adding 10.
Basically we're moving one of the ones
into the tens. e.g. 1 → 0 +10 → 10

So, when you add the digits, it becomes the same num

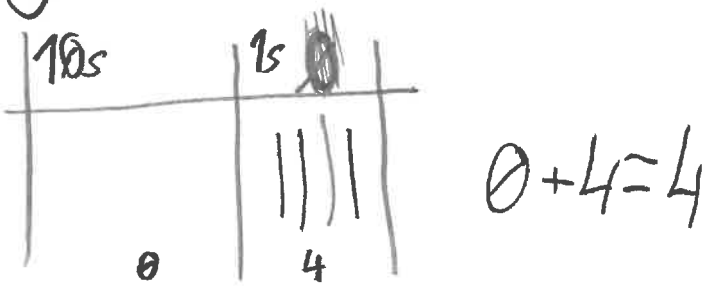
2

$1 \leq n \leq 9$

$\exists x \{x+9=(x-1)+10\}$

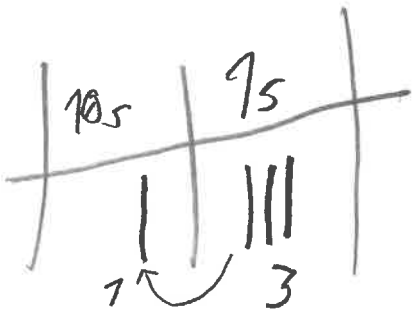
for any value

e.g.



$0+4=4$

+9



$1+3=4$

What if this was in different bases?

7

base 12

$\chi = 1$
$\varepsilon = 1$

~~$+9$~~ $+\varepsilon$

$1\,2\,3\,4\,5\,6\,7\,8\,9\,\chi\,\varepsilon$

We need to add ε, not 9 because $9 < \chi^{(10)} < \varepsilon^{(11)} < 10^{(12)}$
So ε is the biggest digit

$10\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 18\ 19\ 1\chi$

$1\,2\,3\,4\,5\,6\,7\,8\,9\,\chi\,\varepsilon$

100_2

f
1e
2d
3c
4b
5a
69
87
78

4af2

X c

1 8

4af2

X 9

2a f 8 9 Z

7 0
16 H
256 S
16^3 M
16^4 L

5
16 | 80

1 1 4 16
16 | 180
-16
20

24 16
+ 32
48
04
80
96

15
+ 12
30
15
180