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Hi guys! This is the solution of the question "1089"

So first we imagine the unit is x the ten is y . So it's like:

$$10y + x$$

and we imagine the hundred is 2 more than unit so it's

$$100(x+2) + 10y + x$$

So we simplify it

$$100(x+2) + 10y + x = 100x + 200 + 10y + x$$

and we can write the number after change, and simplify it

$$100x + 10y + (x+2) = 100x + 10y + x + 2 \text{ (OK, actually we don't need simplify)}$$

Put them together and simplify it

$$\begin{aligned}
& 100x + 200 + 10y + x - (100x + 10y + x + 2) \\
& = 100x + 200 + 10y + x - 100x - 10y - x - 2 \\
& = 200 - 2 \\
& = 198
\end{aligned}$$

then let's go to the next part of question

$$198 + 891 = 1089$$

so we prove when hundred is 2 more than unit let's go to other situation

$$\begin{aligned}
\text{hundred} + (-3) = \text{Unit} & \Rightarrow 100(x+3) + 10y + x - (100x + 10y + x + 3) \\
\text{(OK, I just made a mistaken)} & = 300 - 3 \\
\text{it is } -3 & = 297 \quad 792 + 297 = 1089 \\
& \quad \quad \quad \text{(correct) } \checkmark
\end{aligned}$$

$$\begin{aligned}
\text{hundred} - 4 = \text{Unit} & \Rightarrow 100(x+4) + 10y + x - (100x + 10y + x + 4) \\
& = 400 - 4 \\
& = 396 \quad 396 + 693 = 1089 \\
& \quad \quad \quad \text{(correct) } \checkmark
\end{aligned}$$

$$\begin{aligned}
\text{hundred} - 5 = \text{Unit} & \Rightarrow 100(x+5) + 10y + x - (100x + 10y + x + 5) \\
& = 500 - 5 \\
& = 495 \quad 495 + 594 = 1089 \\
& \quad \quad \quad \text{(correct) } \checkmark
\end{aligned}$$

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$$\begin{aligned} \text{hundred} - 6 = \text{Unit} &\Rightarrow 100(x+6) + 10y + x - (100x + 10y + x + 6) \\ &= 600 - 6 \\ &= 594 \quad 594 + 495 = 1089 \\ &\quad \text{(correct)} \checkmark \end{aligned}$$

$$\begin{aligned} \text{hundred} - 7 = \text{Unit} &\Rightarrow 100(x+7) + 10y + x - (100x + 10y + x + 7) \\ &= 700 - 7 \\ &= 693 \quad 693 + 396 = 1089 \\ &\quad \text{(correct)} \checkmark \end{aligned}$$

$$\begin{aligned} \text{hundred} - 8 = \text{Unit} &\Rightarrow 100(x+8) + 10y + x - (100x + 10y + x + 8) \\ &= 800 - 8 \\ &= 792 \quad 792 + 297 = 1089 \\ &\quad \text{(correct)} \checkmark \end{aligned}$$

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So now you can see the 2nd part of question will only be 198+891, 792+297, 396+693, 495+594, they all equal 1089

but when hundred - 1 = Unit it is not equal to 1089 because

$$\begin{aligned} 100(x+1) + 10y + x - (100x + 10y + x + 1) \\ &= 100 - 1 \\ &= 99 \quad 99 + 99 = 198 \\ &\quad \text{(incorrect)} \times \end{aligned}$$

when

So the hundred - (x) it will be true, when hundred - (y) it will be wrong.

$x \neq 1 \quad x > 1 \quad x < 10$

$y < 1 \quad y \geq 0$

but if want hundred - 1 = Unit be a part of this pattern you can!

We can write 99 to 099

$$\text{So } 099 + 990 = 1089 !!!$$

it was amazing!!

So let me change my theory, when hundred - (x) it will be true!!!

$x > 0 \quad x < 0$