Problem:

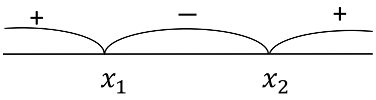
In case of what a the equation $-10a-10|a-x|-85=-15x-x^2$ has at least one root in an interval $(3;7)$?

Solution:

$-10a-10|a-x|-85=-15x-x^2$, the equation must have at least one root in an interval $(3;7)$.

$\Rightarrow -10(a-x)-10|a-x|=85-15x-x^2+10x \Rightarrow\ x^2+5x-85=10(|a-x|+a-x)$, now since $|t|\geq$ $\geq -t\ \ \forall t\in(-\infty;+\infty) \Rightarrow$ for all a *and* x we have: $|a-x|\geq-(a-x)\Rightarrow\ |a-x|+a-x\geq 0, \forall\, a,x\in(-\infty;+\infty)$, therefore $x^2+5x-85\geq 0$, and since according to the condition the initial equation must have at least one root from (3;7) $\Rightarrow$ for that root $x_0 \Rightarrow\ x_0^2+5x_0-85\geq 0$, but we see, that the solution to the inequality $x^2+5x-85\geq 0\ (*)$ will be: $(-\infty;x_1)\cup(x_2;+\infty)$, *where*

$$x_1=\frac{-5-\sqrt{365}}{2},\quad x_2=\frac{-5+\sqrt{365}}{2},\quad but\quad \frac{-5+\sqrt{365}}{2}>7\ (365>361),\quad \frac{-5-\sqrt{365}}{2}<3\Rightarrow$$



No number from $(3;7)$ satisfies the inequality $(*)\Rightarrow$ such a doesn't exist.

Answer: such a doesn't exist.