Negation

1. The negation of $\forall x, P(x)$ is $\exists x, \neg P(x)$
2. The negation of $\exists x, Q(x)$ is $\forall x, \neg Q(x)$

Let us compute the negation:

$$\begin{aligned}
&\neg(\forall x \in \mathbb{R}, \exists y \in \mathbb{R}, \forall z \in \mathbb{R}, P(x,y,z)) \iff \\
&\exists x \in \mathbb{R}, \neg(\exists y \in \mathbb{R}, \forall z \in \mathbb{R}, P(x,y,z)) \iff \\
&\exists x \in \mathbb{R}, \forall y \in \mathbb{R}, \neg(\forall z \in \mathbb{R}, P(x,y,z)) \iff \\
&\exists x \in \mathbb{R}, \forall y \in \mathbb{R}, \exists z \in \mathbb{R}, \neg(P(x,y,z))
\end{aligned}$$