\*\*B) Not Valid\*\*

Here's the breakdown of why the student's conclusion is not valid, from a graduate statistics perspective:

\* \*\*Limited Scope of Inference:\*\* The student's conclusion is based on only looking at the extremes of the data. Specifically, the fact that two people on the old formula felt relief in less than 20 minutes, and that the longest relief time was observed in the new formula group. These observations at the extremes are easily subject to sampling variability and do not provide a robust comparison of the groups.

\* \*\*Ignoring the Central Tendency:\*\* A graduate-level statistician would recognize that a fair assessment of effectiveness requires considering the entire distribution of relief times, not just the minimums and maximums. Key summary statistics such as the mean, median, and standard deviation (or other measures of spread) would be used to give a more comprehensive assessment of the data.

\* \*\*Insufficient Statistical Analysis:\*\* The student is not performing any statistical analysis (such as a t-test, Mann-Whitney U test, or a visual comparison of the distributions' shapes). A proper comparison would involve calculating measures of the central tendency, and considering the spread and shape of both sets of data.

\* \*\*Sample Size Considerations:\*\* While the sample sizes are reasonable (100 and 150), the conclusion is drawn based on a limited amount of data in certain parts of the distribution. This makes the conclusion unstable.

\*\*In summary:\*\* The student's conclusion is overly simplistic and doesn't take into account the overall distributions of the data. It's based on anecdotal observations and lacks any rigorous statistical support. A valid conclusion would require a more in-depth analysis, involving the comparison of central tendency, spread, and possibly conducting statistical tests to ascertain whether any differences are statistically significant.