Problem Set

1. Let there be the translation along vector \( \vec{v} \), let there be the rotation around point \( A \), \(-90\) degrees (clockwise), and let there be the reflection across line \( L \). Let \( S \) be the figure as shown below. Show the location of \( S \) after performing the following sequence: a translation followed by a rotation followed by a reflection.

2. Would the location of the image of \( S \) in the previous problem be the same if the translation was performed last instead of first; that is, does the sequence, translation followed by a rotation followed by a reflection, equal a rotation followed by a reflection followed by a translation? Explain.
3. Use the same coordinate grid to complete parts (a)–(c).

a. Reflect triangle $ABC$ across the vertical line, parallel to the $y$-axis, going through point $(1, 0)$. Label the transformed points $A$, $B$, $C$ as $A'$, $B'$, $C'$, respectively.

b. Reflect triangle $A'B'C'$ across the horizontal line, parallel to the $x$-axis going through point $(0, -1)$. Label the transformed points of $A'$, $B'$, $C'$ as $A''$, $B''$, $C''$, respectively.

c. Is there a single rigid motion that would map triangle $ABC$ to triangle $A''B''C''$?