**Compound Transformations of** $y=sinx$

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| --- | --- |
| $$y=-(sinx+1)$$ | $$y=-sinx+1$$ |
| $$y=-sin⁡(\frac{1}{2}x-\frac{1}{2})$$ | $$y=-sin⁡(\frac{1}{2}x-1)$$ |
| $$y=2sin⁡(x+1)$$ | $$y=sin⁡(-\frac{1}{2}x)$$ |

Match the equations above to the transformations below. Not all equations are given so create a new one where necessary.

1. Reflection in x axis followed by translation $\left[\begin{matrix}0\\1\end{matrix}\right]$
2. Translation $\left[\begin{matrix}0\\1\end{matrix}\right]$ followed by reflection in x axis
3. Vertical stretch scale factor 2 followed by translation $\left[\begin{matrix}-1\\0\end{matrix}\right]$
4. Translation $\left[\begin{matrix}-1\\0\end{matrix}\right] $followed by vertical stretch scale factor 2
5. Reflection in y axis followed by horizontal stretch scale factor 2
6. Horizontal stretch scale factor 2 followed by reflection in y axis.
7. Translation $\left[\begin{matrix}1\\0\end{matrix}\right]$ followed by horizontal stretch scale factor 2 followed by reflection in x axis
8. Horizontal stretch scale factor 2 followed by reflection in x axis followed by translation $\left[\begin{matrix}1\\0\end{matrix}\right]$
9. Reflection in x axis followed by translation $\left[\begin{matrix}1\\0\end{matrix}\right]$ followed by horizontal stretch scale factor 2

**Extension questions:**

1. For which combinations of two transformations does order matter and which combinations does order not matter?
2. What about three transformations?
3. Any number of transformations? I.e., which transformations can always be applied in any order and which cannot?
4. What horizontal transformation of $y=x^{2} $is equivalent to a vertical stretch of scale factor 4.