Math 341 ASSIGNMENT 12, WINTER 2017 **Name:** ____________________

Due at at the start of class on Monday, March 6th

For this assignment you will need to read Section 10.4 that was handed out in class on Monday, or which can be found at my web page under *Open Source Textbooks*, and Section 11.1.

1. Give the *homogeneous* vertex matrix of the triangle ABC shown below:

2. Let T be the transformation that translates all points seven units to the right and one unit up. Below and to the left, give the homogeneous matrix $[T]_h$ of the transformation.

$[T]_h =$ $[R]_h =$

3. Let R be the transformation that rotates all points by $30°$ counterclockwise. Give the homogeneous matrix $[R]_h$ of the transformation above and to the right, with entries in either exact form or as decimals rounded to the hundredth's place.

4. Give the homogeneous matrices of the composition transformations $[T \circ R]_h$ and $[R \circ T]_h$.

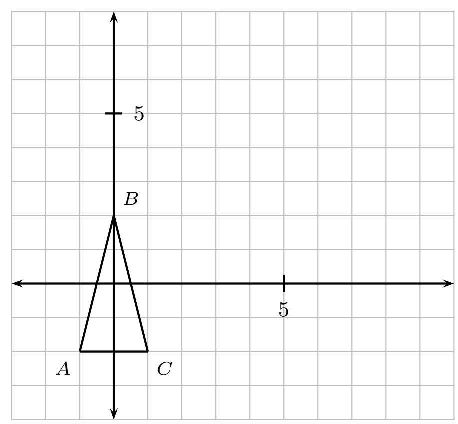
$[T \circ R]_h =$ $[R \circ T]_h =$

5. Give the *non-homogeneous* vertex matrix of the triangle $A'B'C'$ resulting from applying $T \circ R$ to ABC below, **rounding to the tenth's place**. Then plot the new triangle on the grid to the right, labeling its vertices.

   Matrix of $A'B'C'$:

6. Give the *non-homogeneous* vertex matrix of the triangle $A'B'C'$ resulting from applying $R \circ T$ to ABC below, **rounding to the tenth's place**. Then plot the new triangle on the grid to the right, labeling its vertices.

   Matrix of $A''B''C''$:



7. Consider the matrix $\begin{bmatrix} -1 & 0 & 1 \\ 3 & 0 & -3 \\ 1 & 0 & -1 \end{bmatrix}$. For each vector below, circle *yes* if it is an eigenvector and *no* if it is not. If it is an eigenvector, give the associated eigenvalue.

$\begin{bmatrix} 2 \\ 0 \\ 2 \end{bmatrix}$ yes no $\lambda =$ ____

$\begin{bmatrix} -1 \\ 3 \\ 1 \end{bmatrix}$ yes no $\lambda =$ ____

$\begin{bmatrix} 5 \\ -15 \\ -5 \end{bmatrix}$ yes no $\lambda =$ ____