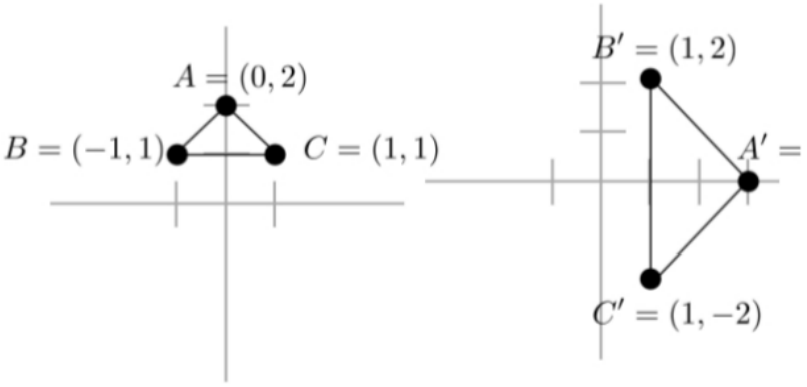
Name:

Student ID:

CS130 Homework 3



1. Find a sequence of transformation matrices (translation, rotation, and scaling matrices) that map the triangle ABC to the triangle ABC.

2. What kinds of transformations can a rigid body undergo?

3. List all the viewing transformations in the graphics pipeline.

4. The z-buffer approach to rendering

   I. selects which fragment to draw based on its depth
   II. orders triangles from back to front
   III. selects which vertices to clip based on their z-values

   (a) I only
   (b) II only
   (c) III only
   (d) I and II only
   (e) I, II and III

5. Indicate where each statement is true or false.

   (T / F) The viewport transformation maps from normalized device coordinates to screen space.
   (T / F) Given any matrices M_1, M_2, and M_3, it must be true that $M_3M_2M_1 = M_1M_2M_3$.

(T / F) Given invertible matrices M_1 ,M_2 , and M_3 , $(M_3M_2M_1)^{-1} = M_1^{-1}M_2^{-1}M_3^{-1}$.

(T / F) If a function is linear it is also affine.

(T / F) All rotations in 3D space can be specified with 2 real numbers.

(T / F) The inverse of a translation matrix is its transpose.

6. Perspective transformations

   I. are linear transformations

   II. keep parallel lines parallel

   III. are affine transformations

   (a) I only

   (b) II only

   (c) III only

   (d) I, II and III

   (e) None

7. What is the matrix on top of the current matrix stack after the following functions are called?

```
glLoadIdentity();
glScalef(2,2,1);
glPushMatrix();
glScalef(1,1,1);
glTranslatef(1,0,0);
glPushMatrix();
glTranslatef(1,0,0);
glPopMatrix();
glPopMatrix();
glTranslatef(2,0,0);
```