Quiz 1, CSci 490, Spring 2005

Name: __________________________

1. [6 pts] Suppose we are performing a perspective projection onto a vertical screen one foot square which is two feet away from the eye. Forty feet away in the same direction, there is a wall ten feet high. If the screen is \(200 \times 200\) pixels, how many pixels high will the wall appear on the screen?

2. 

```c
#include <GL/glut.h>

void drawPolygon() {
    glBegin(GL_LINE_LOOP);
    glVertex2f(-1.0, 0.0);
    glVertex2f( 1.0, 0.0);
    glVertex2f( 0.0, 2);
    glEnd();
}

void draw() {
    glClearColor(0, 0, 0, 0.0);
    glColor3f(0,0, 0);
    glTranslatef(0, 1, 0); drawPolygon();
    glRotatef(90, 0, 0, 1); drawPolygon();
    glScalef(1, -1, 1); drawPolygon();
    glRotatef(90, 0, 0, 1); drawPolygon();
    glFlush();
}

void main(int argc, char **argv) {
    glutInit(&argc, argv); glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(200, 200); glutCreateWindow("Mystery");
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glMatrixMode(GL_PROJECTION);
    gluOrtho2D(-3,3, -3, 3);
    glutDisplayFunc(draw);
    glutMainLoop();
}
```

[10 pts] When the program at left using OpenGL is run, what will appear in the below window?

3. [6 pts] Give a single matrix that represents scaling all coordinates by a factor of \(2\) and then translating the coordinates \(4\) units along the \(z\) axis. Thus, \((2,1,-1)\) should be transformed to \((4,2,2)\) by your matrix.

4. [8 pts] How is an orthographic projection different from a perspective projection? As an example, draw a cube from the same angle using both orthographic and perspective projections.