1. An isometric projection is a parallel projection in which the angles between the projected axes are equal (i.e., $120^\circ$) as shown in the following picture.

Let $f$ be the distance to the far plane and $n$ the distance to the near plane. Assume that $r = 1$, $l = -1$, $t = 1$, and $b = -1$. Define an isometric projection matrix that maps the world-space axes as shown in the picture, with the world-space origin being projected to $x = 0$ and $y = 0$.

2. Assume that we are approximating the circle defined by $x^2 + y^2 - r^2 = 0$ and $z = d$ (in eye space) by a hexagon. If the focal length is $e$, what is the maximum error in the radius of the approximation in projection-space coordinates.

3. One way to make LOD transitions is to use an $\alpha$ fade, where you lerp the $\alpha$ channel to blend the two LODs. Assume that you have a triangle $\langle p_1, p_2, p_3 \rangle$ and a vertex $q$ that bisects the line $p_2p_3$, splitting the triangle into two triangles $\langle p_1, p_2, q \rangle$ and $\langle p_1, q, p_3 \rangle$. Define a function

   ```c
   void alphaLerp (float eye[3], float c[3], float t);
   ```

   that takes as arguments the eye position, the triangle’s color ($c$), and a parameter $0 \leq t \leq 1$ that controls the blending of the two images. When $t$ is 0, just the single triangle should be drawn, and when $t$ is 1, just the triangle pair should be drawn. You may use mathematical notation or C code to write your answer, but it should clearly specify the OpenGL state used in rendering.