1. Let \( R(t) = (1, 1, 1) + t(-1, -1, -1) \) and let \( S \) be the unit sphere at the origin. For what values of \( t \) does \( R(t) \) intersect \( S \)?

2. Given two bounding spheres \( S_1 = (c_1, r_1) \) and \( S_2 = (c_2, r_2) \), write the pseudo code to compute the minimal bounding sphere that encloses the intersection of \( S_1 \) and \( S_2 \).

3. Let \( M = \begin{bmatrix} N & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \) be a \( 4 \times 4 \) matrix. Show that \( M(x, y, z, 1)^T \) is the same as \( M(hx, hy, hz, h)^T \) after homogenization.

4. Suppose you have an application with a near plan of 4 meters, a far plane of 100 kilometers (\( 10^5 \) meters), and a minimum feature size of 1 meter. How many bits of Z-buffer do you need to avoid errors? What if the near plane is at 1 meter?