Questions

1. Consider the intersection of a ray with the ellipsoid $4x^2 + 4y^2 + z^2 - 16 = 0$. Suppose that the viewpoint (i.e., the starting point of a view ray) is at $V = (1, -1, 0)^T$ and the viewing direction is $D = (0, 1, 1)^T$. Does the ray intersect the volume? If yes, compute the intersection points between them.

2. Consider the intersection of a ray with a triangle. The three vertices of the triangle are $A(2, 0, 2)$, $B(0, 3, -2)$, $C(-2, 3, 2)$. We shoot a ray from the origin in the direction of $(1, 1, 1)$. Does the ray intersect the triangle? If yes, compute the closest intersection point between them.