1) Describe how to test if a ray with origin $\vec{x}_0$ and direction $\vec{d}$ intersects an infinite cylinder centred on the $y$-axis with radius 1.

2) Which is faster, and why: raytracing or rasterizing a single triangle?

3) Explain a problem that can happen with shading a triangle mesh if smoothly interpolated normal vectors are used.
4) What is an effect that pathtracing approximates which regular raytracing (like assignment 3) cannot?

5) Describe how to incorporate shadows into a matte shader using ray tracing.

6) Why is clipping of some sort necessary for the Z-buffer algorithm when used with perspective projection via $4 \times 4$ matrices and homogeneous coordinates?
7) Describe how to test if two points, \( \vec{p} \) and \( \vec{q} \), are on the same or different sides of the plane containing a triangle with vertices \( \vec{x}_0, \vec{x}_1, \) and \( \vec{x}_2 \).

8) Given \( n \) points stored in a BVH of spheres, develop an efficient algorithm for finding the closest point to the origin.